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ON THE USE OF MARINE MANURES.

To the Editor of the Farmers' Register.

It has often been to me a subject of surprise, that the various substances abounding on the shores of the Chesapeake and its tributaries, and which, for the want of a generic name, I shall class under the general head of marine manures, have attracted so little attention in Virginia. Whilst our more enterprising and industrious neighbors of Maryland, have by the liberal use of these means, been converting a barren and exhausted soil into fertile and productive fields, the farmers of Eastern Virginia, with the most abundant resources within their reach, seem to have been almost entirely ignorant of their value, or indifferent about their application. I deem it not amiss, therefore, to call the attention of the farmers on tide-water to the value of these resources, by communicating for your Register, though in a hasty and imperfect manner, my experiments and reflections on this interesting subject.

Under the head of *marine manures*, I shall embrace, in the order of their respective values, sea weed, (*Alga marina,*) or sea ware, as it is called on the Eastern Shore of Maryland; Indian bank shells, oyster shell lime and marsh mud.

About two years ago, finding it utterly vain to attempt to improve a large and exhausted farm, by the unaided resources of the stable and farm yard, I determined to look out for some other means of improvement. I accordingly commenced on my Potomac farm vigorous and extensive operations with the marine manures of which I have spoken. I committed a fatal error however, at the outset, in adhering to the ruinous three-shift system, without the aid of artificial grasses, upon which, I verily believe, no great or permanent impovement can be effected with any thing short of a mountain of stable manure, and hands and teams without limit, to apply it. It is true, that upon this system, by great attention and the regular application of all the fertilizing means within the reach of our tide-water farms, crops may be considerably increased, and the land gradually improved: but let this great attention be in the least remitted, and the diminished returns of the farm will soon demonstrate the deterioration of the land. I have since adopted the four-field rotation, with a standing pasture and the extensive cultivation of clover, and I have no doubt I shall soon reap the reward of my labor, in the increase of my crops, and the permanent improvement of my land.

I soon found, in the application of manures, that no great reliance could be placed on the occasional services of the farm hands and teams. I therefore detailed for that exclusive purpose a regular force, consisting of a man, a woman, and two small boys just large enough to follow the carts, with two carts properly constructed, and an abundant supply of oxen. With this force exclusively devoted to collecting and carting out manure, I applied during the last year upwards of 5,000 loads. The whole annual expense, including estimated wages wear and tear of carts, &c. may be fairly set down at $250, making the manure cost about *five cents* a load. Yet few of our farmers can be convinced that they can spare time and labor for this essential operation.

My farm bordering more than a mile on the Potomac, affords a fine opportunity of collecting the *sea weed*, and my principal and most successful experiments have been with this valuable manure. For nine months in the year, from the 1st of August to the 1st of May, it is in great abundance, and my carts have usually carried out, according to circumstances, from 15 to 30 loads a day. During the last year I applied to various crops about 3000 loads of this manure, and with great effect upon all. My first experiment was with corn. I applied it at the rate of about 70 loads to the acre, in the water-furrows of a field intended for corn the next year, and *listed* upon it. The effect on the corn was immediate and powerful; doubling, I am confident, the crop on the poorest and lightest parts of the field, and greatly improving it wherever applied. I next applied it on a piece of very poor land, at the same rate, and fallowed for wheat, leaving in the middle of the lot a space of two acres, unmanured, which had previously been sowed, as an experiment, with cow-peas. The whole was put in wheat during the first week in September 1832. The wheat on the manured land grew off beautifully, leaving far behind that on the other part of the lot. At Christmas it was exceedingly promising; but unfortunately having been sowed too early, the fly in the spring nearly destroyed it. During the same fall, I applied the *sea weed* as a top dressing to the poorest parts of my wheat and corn land, and in parts of the field I had it ploughed in with the wheat. Both applications produced most decided effects, the growth of wheat being thick and luxuriant on land which before this manuring was not considered capable of producing wheat at all. The fatal mildew, however, of the last summer, greatly injured the crop although it did not affect those portions of the field, by any means as much, as other parts to which this manure had not been applied.

My next experiment was with oats, on which the effect of this manure was truly astonishing. I selected the poorest knoll in my field, bordering upon a small stream, along the side of which was a strip of land considered rich. I gave a liberal dressing to the knoll, and left the bottom unmanured, and fallowed during winter for oats, which were sowed in March at the rate of two bushels to the acre. When I prepared this piece of land for oats, an intelligent neighbor and friend of mine remarked to me, that if I succeeded in getting a crop from it, he would never afterwards doubt the efficacy of *sea weed*.

We visited the farm together shortly before harvest, and he expressed the greatest astonishment at the growth of the oats. The line was distinctly visible which marked the extent of the manuring; the oats on the poor knoll being from 6 to

12 inches higher than those on the rich bottom. I verily believe I do not exaggerate, when I say that the oats were higher than *some* of the corn stalks of the crop preceding the manuring. I tried this manure also as a top dressing for oats followed by clover, with decided benefit on both crops. Its great efficacy in counteracting the effects of drought is very remakable, and was strikingly exhibited in my field of corn during the excessive drought of last summer. The parts manured with *sea weed* continued green, long after the rest of the field had faded, and produced a tolerable crop, notwithstanding the great severity of the drought. I am now making an application of it, the operation of which I have yet to test. I am top-dressing a field of clover sowed last spring, that I design to fallow for wheat next summer. I have been informed by an intelligent gentleman who witnessed the experiment in New Jersey, that good farmers in that state purchase this manure on the sea coast at 25 cents a load, and after carting it several miles into the interior, apply it with profit to their grass lands. I have little doubt that my experiment will be successful.

In an admirable treatise on agriculture in the New Edinburgh Encyclopædia,* (to which, if it has not already attracted your notice, I would beg leave to direct your attention, as furnishing many valuable extracts for your Register,) the opinion is expressed, that "in one respect *sea weed* is preferable to the richest dung, because it does not produce such a quantity of weeds." I do not know whether its effect will be so permanent or not, but for a single crop, I hazard nothing in saying that in sufficient quantity it is equal to the best stable manure.

The wonderful effects of this manure are not to be attributed so much to the vegetable matter which it contains, as to the quantity of salts and animal mucilage intermixed with it. It is doubtless this animal matter (consisting of sea nettles, young shell fish, and the spawn and *fæces* of the finny tribe,) that produces so striking an effect on wheat on light lands. According to the writer in the Encyclopædia to whom I have referred, it has produced a wonderful effect on the sea coast of England, imparting to light land sufficient tenacity to produce wheat, and to resist *mildew*. I do not know what this manure would yield on analysis; but I think it probable a quantity of *gluten* would be afforded, which is essential to the growth of wheat; and this may account for the remarkable fact observed both here and in England, that it imparts to the lightest soils the capacity to bear heavy crops of wheat. You may find in the 1st vol. of the American Farmer, an interesting letter from Thomas Griffin, Esq. of Yorktown; and in the 13th vol. of the same work, a valuable communication from an Eastern Shore farmer, signed "Cornplanter," on the great virtues of this manure:† the republication of these papers might possibly be of service by rousing the attention of some of our lethargic farmers, to the inestimable value of an article heretofore regarded by them as a nuisance, being suffered to remain fermenting and putrefying on the shores; and infecting the atmosphere with the most fetid and pestilential odors.

Most of the farms on Potomac abound with banks of partially decomposed oyster shells, whether left there by the Indians, or brought to the surface by some great convulsion of nature, from the former bed of the river, I leave to geologists to determine. I have used these shells in considerable quantity, and with very manifest advantage. They do not act promptly or so powerfully as the *sea weed*, but are probably more permanent in their effects. In combination with *sea weed* and other putrescent manures, they have all the effects of marl in giving permanency to the improvement. The late Mr. Ellyson Currie, of Lancaster, who was the most zealous farmer of my acquaintance, used these shells very extensively; and whenever I met with him, he expatiated with delight and enthusiasm on the great benefit derived from them. He used them, however, without a sufficient attention to artificial grasses, and probably without the application of a due portion of putrescent manures; and the consequence has been, as I have been informed since his death, that parts of his farm, now exhibit the appearances invariably produced by an over-dose of calcareous matter, without a due application of putrescent and vegetable manures.

The value of oyster shell lime as a manure is so generally understood, and has lately been so well attested by the successful practice of Mr. Lewis of Wyanoke, and other contributors to your Register, that I deem it unnecessary to say much on that subject. I have applied it to some extent, and with obvious advantage to wheat and clover: but having a great abundance of other materials much more accessible, I have not yet devoted much attention to lime. I am now, however, about to burn a quantity of shells, with the view of making a compost of old corn-cobs, marsh mud, stable manure and lime, hoping in this way to derive some advantage from the corn cobs, which heretofore I have found it almost impossible to reduce to the food of plants. Under ordinary circumstances, I do not approve of expensive composts; but having all the necessary materials at hand, I shall form my compost during wet weather, when the fields will not bear carting over them, and when my manuring force could not be profitably employed about any thing else. In this way it will cost but little.

I have made some experiments with *marsh mud*, which at first promised to be very successful, but I must confess that my expectations have been somewhat disappointed. To apply it, requires more labor, and that of a very disagreeable kind, than either bank shells or sea weed; and in my hands it has proved less efficacious than either of them. It is possible that I have committed some error in applying it, as I have been assured by a gentleman of high respectability, from the Eastern Shore of Virginia, who had used it extensively, that he would not exchange it load for load, for the best stable manure. I entertain no doubt that when better materials are not to be had, it may be used with very great advantage.

The beds of fossil shells, in this country, denominated *marl*, may possibly be considered as belonging to the class of *marine manures;* as in all

* By Robert Brown of Markle, (Scotland,) who was a judicious and successful practical farmer on a large scale, as well as an excellent writer on agriculture in general—two characters which unfortunately, are seldom found combined in the same person.—[*Ed.*

† "Cornplanter" *was* republished, p. 314, Farm. Reg.

probability they are of marine origin. But the period of their connexion with the sea is so remote, and the means by which they were transferred to their present positions, so indistinctly "known to our philosophy," that I have not thought proper to class them under this category. It is not however foreign to the purpose of this essay to say a few words on this interesting subject.

Your '*Essay on Calcareous Manures*,' and the articles in the Register on that subject, have excited great interest in the Northern Neck, as well as in other parts of the state. The subject is discussed in almost every company, and some of our practical farmers are already applying marl, and many others are in search of it. It is a very fortunate, and seemingly providential circumstance, that as soon as we leave the flat lands of the rivers and creeks, and come into the forest, where *marine manures* are not to be had, marl is found in abundance. I have now in my possession several specimens, some of them uncommonly rich, found since the publicatiou of your book, in different parts of the Northern Neck. You have just cause to be proud of having conferred so great and lasting a benefit on your country.

I cannot close this long, and I fear tedious communication, without expressing the confident opinion, that the cultivation of artificial grasses, particularly clover, is absolutely necessary to secure the full benefit of any system of manuring. I fully concur with your correspondent Mr. Archer, of Fort Monroe, that in eastern Virginia we have committed a great error, in supposing that our lands will not produce artificial grasses to advantage. My limited experience and observation entirely confirm the view so well expressed by him. It may be safely affirmed that there is not on the face of the globe, (possibly with the exception of China,) a highly improved and well cultivated country, in which artificial grasses are neglected. If China be an exception, the peculiar condition of that country, will afford the best reason for the practices there adopted, whilst it should teach us the impossibility of following the example.

Whilst on the subject of grasses, I will inquire if the question, whether plaster will act in the vicinity of salt water, has yet been satisfactorily settled by the experience of practical farmers? I design to make some experiments with it in the spring, and may possibly send you the result of my observations.*

I hope sir, that you will receive this communication as an earnest of the zeal with which I desire to co-operate in the noble cause of agricultural improvement. I should be happy if I could bring to your service, any thing calculated to give effect to your labors. But I am well convinced, that neither my skill nor success as an agriculturist, give me the slightest claims to the confidence of the public as a teacher of the science.

WILLOUGHBY NEWTON.

Westmoreland Co., Va. Dec. 16, 1833.

[The foregoing communication does not need our commendations to aid it in attracting attention; but we cannot repress our inclination to greet with welcome a new ally and efficient fellow laborer, in support of the most neglected and yet most improvable region of Virginia. Mr. Newton's facts (which are the more valuable, because failure is stated as well as success,) furnish the best of arguments to prove that no where else can soil be more cheaply fertilized, and no where are better profits offered to the judicious and economical farmer, than in the lower tide-water counties. Yet vast quantities of land, possessing in abundance either the" marine manures "described by Mr. Newton, or the richest beds of fossil shells, may be bought for prices varying between $2 and $4 the acre, although an enhancement of valuation (caused by late opinions of these advantages,)has begun to affect selling prices. Our individual location is in a higher and less favored region, and therefore we are not misled by personal interest when we venture to predict that the counties on the salt water of Virginia will hereafter be the most valuable portion of the state.—Ed.]

* We have no experimental knowledge of gypsum acting near salt water, but have fully proved its efficacy on soils *after* marling, on which *before*, that manure was totally worthless; and its inertness even near fresh tidewater, has been generally attributed to the sea air. If our correspondent will try gypsum on clover where he has already applied his oyster-bank manure in abundance—or if he can cause the like experiment to be made on some of the land injured by Mr. Currie's excessively heavy dressing, we entertain but little doubt of his success.—[*Ed. Farm. Reg.*

ARABIC WORK ON AGRICUTTURE.

Translated for the Farmers' Register.

University of Virginia, December 28*th*, 1833.

Dear Sir,—I send you a translation of the first article of the first chapter of the Arabic work on agriculture, compiled by *Ebu Zacharia, Tahia, Ebn-Mahomed, Ebn-Ahmed, Ebn-el Awam.* This author wrote his work in the sixth century of the Hegira, (the twelfth century of the Christian era,) when culture of every kind flourished most among the Arabs of Spain. He was a native of Seville, and his estate was situated in Alxarafe, where he lived and made his agricultural experiments and observations, to which he added the maxims of a great number of geoponic writers of different ages and nations.

The Arabs, or Moors, masters of southern Spain, introduced from Africa and Asia, into their country, and acclimated there, a variety of plants and garden vegetables, before that time unknown in Europe, and for the possessing of some of which we are even now indirectly indebted to them.

I am afraid, however, that many errors will occur in my translation of the names of various objects in husbandry; the Spanish translator seems to make his own sometimes a matter of guesswork, and my knowledge of agriculture, botany, geology and also of the Arabic and English languages is not so very profound, as to be able always to set him right when he seems to be wrong, and to give myself the most exact and best corresponding word in the English.

From such errors a deal of mischief may arise. Germany is, to this very day deprived of the enjoyment of one of the finest and most wholesome vegetables—the tomates,—because, forsooth, the name of this delicious vegetable had been badly translated into German. The name "tomates" given to this fruit by the Moors, from a superstition concerning certain virtues which it was

thought to possess, being rendered in Spanish by Manzana de Amor (love-apple) was, from the natural permutability of the lingual letters *l* and *n*, and of the dental letters *z* and *s* pronounced, and afterwards written, by the Italians *Malsana di Amore*, (insane from love,) and by abbreviation only *Malsana*, (unwholesome or insane,) which name the Germans, who received this fruit from Italy, translated, with seeming accuracy, by toll-apfel (madness-apple,) and hence this fruit, though cultivated here and there in Germany, as a curiosity, is never eaten by any one: for who would like to become mad? as it is thought this fruit will make him who should be rash enough to despise the warning contained in its very name.

However, as I hope, with some degree of confidence, that nothing of this sort will happen to enlightened Virginia, should I even, from my being little better than "a mere mimick's mimick," commit a similar or a worse blunder, here follows the English translation of the first article of the first chapter of the work, treating of the different qualities of soil, and the signs to know them by.

G. BLÆTTERMANN.

The first thing to be acquired in the science of agriculture, is the knowledge of soil, in order to be able to distinguish the good from the inferior; for he who should not know the most essential branch of husbandry, deserves the name of ignoramus, not that of farmer.

According to the demonstration of Rasis in his work entitled "Physical Auscultations," rocks of considerable size become pulverized, by the action of heat and moisture, in the space of a century. Thus, by the continued influence of the sun and rains on the surface of the earth, a soil is formed proper to admit of vegetation; for earth drawn from wells and other excavations, though it should contain all the apparent qualities of good soil, will be steril the first year; but, after having been penetrated by the sun, and moisture of showers, it becomes often highly fertile. Thus it is evident that no soil can be productive, unless it be warmed by the sun and penetrated by rain. The earth is naturally cold and dry, yet though this be a natural and general quality of the earth, there are nevertheless some soils warmer and more humid than others. The warmest, and hence the most fertile soil, according to all the most intelligent agriculturists, is the black mould; next to which comes that which is of a red color; whilst the white is the coldest, and hence the least fertile of all, and yellow soil is but little better. So that white soil will be more or less cold, according to the more or less whiteness it has, and the same may be said of the yellow, and in proportion of the other colors respectively.

The best soil, for warmth and moisture, is that which, in its texture and color, resembles old rotten dung; which does not harden into clods; does not dry and crack open in the heat, nor is loose like sand and gravel. But there are few spots where such a soil is found in a natural state, and therefore, we must call good such soil as only resembles it in some degree.

Abu-Hanifa Dinurita, the prince of agriculture, says: soils whose texture is porous or spongy, and pulverize easily under the plough, or the spade, like sand without their being actually sand, are best adapted for vegetaton, on account of their easily imbibing the water from showers or from artificial irrigation, to nourish the roots of plants, which increase and flourish most under a frequent supply of moisture. On the contrary, soils of a compact texture, easily hardened by heat, not imbibing moisture, are extremely steril, for the roots of plants cannot dilate and be nourished by moisture, as they ought to do to vegetate and grow well.

There are two kinds of soil, both unproductive; the one consists of mere sand, and the other of mere clay: the former, though it imbibe moisture quickly, from its loose texture, causes it to evaporate as quickly from the surface, or to sink too deep into the ground, before it can profit the plants that are to grow in it; and the latter being at one time too wet, and at others too dry and hard, is equally unfit for vegetation. However, by a proper mixture of these two soils, under good tillage and frequent dunging, both may in time be ameliorated and rendered productive. Such soils are frequent in Mesopotamia, the torrents having washed into the plains not merely the trash and surface soil of the high lands, but also a good deal of clay and more sand.

Solon says the same of soils, and adds, that, soils are good and productive, on account of the combination of heat and moisture they contain; that blackness, in a soil, indicates its being hot, and the redness thereof indicates the same thing, though in a less degree; that yellow soil is least hot, and approaches most the quality of cold soil, and that white soil is what usually is denominated cold soil. The qualities of soils are known to observers, by evident signs: that which is best adapted for vegetation must be hot and moist, and must, in color and texture, resemble old rotten dung. Next in quality, is that which has a good mixture of fine sand, fat clay, and black mud. That soil which consists of mere sand and gravel, without any admixture of clay and black mud, is very inferior. Clay alone is better than sand alone, as it can be improved with less cost, where sand is nigh, by an admixture of that article, than sand alone, by an admixture of clay.

Sidagos says: when we examine attentively the different classes of soil, we cannot help perceiving that it is necessary that they should be more moist, rich and porous, than hot, as the sun's heat may warm them sufficiently for vegetation, whilst, without richness and porosity, the plants would not take roots, and consequently, could not grow. Should, however, both qualities, viz: heat and moisture, meet in the same soil, it would be so much the better. Nothing is more true than the opinion of Sidagos on this subject, says Aben Hajaj, that black soil is the best, and so all the ancients have considered it, and that the red with a shade of blue is the next in quality, and that such land as contains a good mixture of clay and sand with alluvial mud is also very good.

Democrite says, that such a soil as, in rainy weather, does not swell very much, and in hot weather does not easily crack open, is of a very good quality. However, we know that in the environs of Carmona, the land is very much cracked in summer, and yet they reap larger crops of wheat there, than any where else. Therefore, we ought not to reject such land, unless we can more advantageously cultivate the best kind indicated above. In the black soil we mentioned, resemb-

ling old rotten dung, every thing, either grains, garden vegetables, or fruit trees, grows to advantage, whilst, in that having the qualities of the land around Carmona, nothing but wheat will grow.

According to Kastos, the best land is that which imbibes most moisture, and in which grass and weeds are growing luxuriantly, when left uncultivated. Junius Moderatus Columella says: "that land, which is destined to bring garden vegetables, must not be white, coarse-grained, nor easily hardened in the heat of summer. Such land when well ploughed and mixed with dung may serve to plant an orchard in. For garden vegetables, we ought to choose a soil that contains much alluvial mud, and which you may find out easily by stirring a handful of the soil in a vessel with water. Should you find, from not muddying the water much, that most of it is sand, you must not use it for cultivating garden vegetables, until by a proper mixture of dung, and black mud from ponds and rivers, you have rendered it fit for your purpose. You may also know the quality of soil by taking up a part of it in your hand: if, by pressing it, you find it similar to wax, it will be good soil for producing vegetables.

Aben-Hajaj, in his treatise on the different soils, says that some farmers, in order to know and judge of the quality of land, make use of their taste and smell; others of their sight and touch, and others again judge of it by the plants that it produces naturally. But the examination of it by the sight and the touch is also subject to little error.

Junius Moderatus Columella, says: soil of a good quality is known by seeing that it easily imbibes the water, becomes after rain soft and slimy, without baking or becoming hard afterwards, in the heat of the sun. This same author tells us, that some ancients had discovered another method to judge of the quality of land, viz: when forest trees of great magnitude grow in it whose branches are so thickly interwoven that the sun cannot penetrate, this is a sign that the land is good. On the contrary, when forest trees are only of a middling height, and their branches and foliage but thin, such land on which they grow is but of a middling quality; but should such trees be dwarfish, and their foliage poor, you may be sure the land is poor also.

Those that judge of soil by its taste, will prefer the sweet to that which tastes strongly of salt. And on this subject Columella says, that when taking some earth from a certain depth, you mix it with sweet water, and taste the water when it has become clear, if you find it of a saltish taste you may be sure that it is good for no other vegetable but palm trees, or at most, for cabbages and cucumbers.

Those who use their smell to judge of the quality of land, say that no soil is good that has any bad smell; and Democrite says, that it is a sign of good land when, excavating it to the depth of two feet, you take a part of the earth from the bottom and put it in a glass in which some rain water or sweet water from a river had previously been poured, you find, after it has clarified, the water to have neither a disagreeable taste, nor an offensive smell, you may know that the land is of good quality, and will be productive in grain, as well as in vegetables and trees, that you should wish to raise.

Kastos says, that land of a fetid smell, and of a saltish taste, is only good for palm trees. According to Aben-Hajaj, some farmers take for their guide, in the selections of land for tillage, the plants that grow on it naturally, which I think is the surest way of judging of its quality. When they see the large thistle and the wild hemp, growing spontaneously on any land, they pronounce it good without hesitation, for they know that these two kinds of weeds only grow in the very best land. On the contrary, when they preceive any wild *Zaatar* (penny royal?) wild sorrel, *Anrutin* (poverty grass?) cinquefoil, tribalus and wild wheat? growing on any land naturally, th y at once pronounce it poor, and are seldom mistaken in this respect. It is not the same with other weeds, which will grow equally on rich and on poor land, such as the wild onion and others. Some say that rich land, though it should be left for a long time without cultivation, does not so easily grow up in scrubby oaks, pines, cypress, wild wood, &c. as poor land does when left untilled.

We have now, says Aben-Hajaj, quoted the maxims of different authors, on the qualities of land, with respect to the advantages and disadvantages that farmers may expect from them, and perhaps some will say, that those very soils which these learned authors disapprove of, have been found to be highly suitable to certain kinds of plants, which, besides being produced in them abundantly, are of the best quality. This is undoubtedly true, but such kinds of plants are but few, and commonly of little utility, whilst the most useful plants such as wheat, barley, beans, peas and other vegetables for the support of man and beasts, can only be raised in such lands as have been approved of, by those authors.

According to Solon, in good, moist, rich mould, every vegetable you plant or sow, comes well, and with the assistance of God, prospers and produces a plentiful crop: who would therefore prefer a poor, dry, sandy soil, though lupins may grow well in it? especially when he could have the former with equal convenience. In a good soil will grow all that can be raised in sand; but who would sow wheat on sand, before it has been improved by a great admixture of clay and dung? In sand, we see that pine trees and some species of thorn will grow tolerably well: but who would plant apple, pear, or cherry trees in such a soil? Thus, that land out to be considered the best in which most things will grow for the food and comforts of man. But some persons will ask: the inheritance which our fathers left us, consists of such a soil as you describe to be naturally poor and unproductive, must we abandon it and seek a better soil elsewhere? My answer is: by no means, but you must by industry, perserverance and judicious management, improve and ameliorate your inheritance, and make it yield, with the assistance of God, abundant crops of every thing necessary for your support, and that of your family; the means of doing so, are within the reach of every intelligent husbandman.

Aben-Hajaj says: though it cannot be denied that apricots, pomegranates and quinces will grow in a poor sandy soil, it is nevertheless a fact, that, if such a soil be improved by an admixture of clay and dung, those trees will yield a larger and more juicy fruit. In the Nabathean Agriculture, treating of the same subject, we find the following ex-

pressions by Sagrit: "Know that soils are very different and various in their qualities, some are cold, some dry, some moist, others are compact, and others again are loose and porous in their texture. All which farmers ought to know, together with the different plants that suit each respectively, and their amelioration under culture; this latter is the very acme of agricultural science, and the perfection of the art of husbandry."

Adan, of praiseworthy memory, says, "land which is of a dark brown color, imbibing easily the water from rain or from irrigation, without becoming like clay prepared for making bricks, but remaining porous enough for any person to squeeze out the water, should he press a clod of it between his hands, may be considered the best of all." According to Yambuchad, the most valuable land is that which, in its color, approaches most the violet. This color is mostly found in land that has been left for some time covered by sweet water, the sediment of which has been incorporated with the soil. In the Nabathean Agriculture, we read, that when rain water remains for a time stagnant in bottoms, after washing down from the high lands much of the surface soil, the land contracts a violet color, which is always a sign of fertility. But should this water have stood too long, and the earth have become almost blue, it will be some time before, under the influence of the sun, and good tillage, it can, with the assistance of God, be made to resume its fertility. The land next in quality after the violet, says *Yambuchad*, is that which, in color and substance, resembles ashes, and whose dust is sweet without mixture of other tastes. Next to this comes what Adan, of praiseworthy memory, calls hot soil, one of whose qualities is, that it easily crumbles under the plough, and which is neither too much contracted by heat, nor too much swelled by moisture. Then comes the land of a light gray color: such land is rather hard, yet docile under the plough; with dung, it will bring tolerable crops of grain, but it is not good for fruit trees. Sagrit, however, is of another opinion, in this respect, for he says, that such land is well fitted for fruit trees, which succeed well and bear excellent fruit. My own experience contradicts him.

Red land, especially when it has water convenient for artificial irrigation in dry weather, is good for all sorts of grain, vegetables and fruit trees, except the palm tree. Such land as farmers call crummy is also good for all kinds of grain and fruit trees, but is unfit for garden vegetables. The author of the Nabathean Agriculture, says: crummy land, is that which holds the medium between fat and meager land, which we call *sahalat*, (docile or improvable,) and also, such land as has the appearance in hot weather of being sprinkled with white dust, is commonly salt, and consequently, only fit for palm trees. or at most, for barley, beans, peas and the like. Soil which, on trial, proves to be of a disagreeable taste, may yet be fit for vines, such as melons, pumpkins and other plants that are creeping on the ground; nay, fruit trees, have been known to grow well in it, as well as grains; for garden vegetables of the finer sorts, and odoriferous herbs, it may not be so suitable.

These are the distinctive signs of the good or bad quality of land, which must be chosen or rejected, according to the convenience and profit of him who wishes to cultivate it. Let it be understood, however, that any soil may be rendered productive in time, under a good system of tillage and manuring.

[We feel confident that many of our readers, whether agriculturists or not, will feel obliged to Professor Blættermann for the foregoing translation, as well as for the short passages from the same work, which we took the liberty of publishing in No. 8, (page 492) from his private letter in answer to our inquiries. It is true, that no instruction can be expected from such antique works on agriculture—but it is still highly interesting to learn what opinions prevailed in early ages, and among a people so different in manners and religion from all the now civilized world, and who then possesed all the refinement and learning in western Europe. The "*Boke of Husbandry*" (extracts of which we presented in No. 6)which is a similar *literary* curiosity, was written 400 years after this work of the Mahometan author, who wrote at a time when our English ancestors were so sunk in ignoronce, that to be able to read was a distinction which but few possessed, who were not educated specially for the service of the Church.]

NECESSITY FOR A LAW TO PERMIT DRAINING IN VIRGINIA.

To the Editor of the Farmer's Register.

I have seen and read with considerable pleasure in the seventh number of your valuable Register a piece "*On Draining*, addressed to Young Farmers. "This a subject which has engaged much of my time and attention for several years past, as you may suppose from the publication I now send you. It was written in 1826, and inserted in the Petersburg Intelligencer of that year. I submitted it to the inspection of my worthy friend ——, who at that time was a member of the Virginia legislature, and who is yet living, and in the full enjoyment of a high and responsible station. Here follow my publication and his remarks.

"When we call to our recollection the great and rapid internal improvements which have been made within a few years in the United States; and when we cast our eyes to some of the northern states, New York in particular, our minds are enlivened with delight and admiration at the ingenuity of man. The name of Clinton will be associated with that of Fulton, and they will live with time, and be reverenced as benefactors of their country.

"The spirit of internal improvement has commenced in our state, and within a few years, considerable industrious exertions have been made by our citizens towards internal improvement. What seems to occupy the most of our attention on this subject, is rendering our rivers navigable and turnpiking our public roads. This certainly is of great importance, and whenever completed, will add much to the advantage and wealth of our state. But this is not all to be expected or required—this is not all we believe can and should be done. To all of us who reside contiguous to rivers, creeks or smaller tributary streams, it is well known that we have observed the great quantity of low land which is at present rendered the nursery of moschetos and miasmata. In its unreclaimed situation it can be of no possible advantage to its owners, and never will be, so long as it remains in this state.

"We cannot be insensible of the industry of our ancestors. With a hasty hand they have cut down, cultivated, and lain barren with deep red gullies, much, and we may say, the greater part of our high land, the soil of which now rests in silent repose adjoining our water courses. With steadiness, industry and enterprise, it devolves on us to turn our attention to the reclaiming and making productive that land which, until within a few years, has been considered of but little value. Immense capital, by individuals collectively, have been spent in endeavoring to make their tracts of land valuable by reclaiming their own low land; but as yet they have not met with their expectations; being at first unacquainted with the nature and principles of ditching. Without a good descent for the water, it is impossible to have land well drained; and to prove the impracticability of ditching without the above conveniency, it may not be improper to make the following illustration. Suppose A, B, C and D, have tracts of land bordering on a water course adjoining E's, which is below them, and to which is attached a large quantity of low land, and without reclaiming this low land, they will be compelled to cultivate their poor land, not producing more than half a sufficiency for support; that they call on E and inform him of their wish, proposing at the same time for him to join them in their undertaking, that they cannot obtain a sufficient descent without carrying the ditch through his land; that E says he felt no disposition to join them; that they then state they will either buy of him at a fair valuation, or reclaim his land for him; he refuses their offer, and by so doing they are constrained from reclaiming their land. It is also distinctly understood that the land of E is not worth more than one fifth of A, B, C and D's land when reclaimed, and in the present and the continuing situation not any of their low land can be worth to them any thing. The question necessarily arises, what should be done to enable A, B, C and D to have their land reclaimed?

"Cannot the legislature take as much cognizance of their necessities and sufferings, and accordingly provide for them with as much propriety as to make new roads through favorite land, and even by private desirable situations?

"The above short address is made to the public for information. The author is well apprised of the novelty of the subject, and that its importance, as yet, has attracted the attention of but few individuals, and believes time only is wanting for due reflection and consideration to discover the necessity of some provision. Legislative assistance is deemed as indispensably necessary in making ditches, as in making canals or public roads when every circumstance is fairly considered and investigated.

"The above is respectfully submitted to the better information and judgment of the enlightened people of Virginia.

A Citizen of Nottoway."

"The Deep Creek Navigation Company have met a most unnatural opposition and obstacle to their progress in rendering that creek navigable. Eight individuals who own lands on that creek, of the best quality of low grounds, which are entirely insecure for want of a proper system of draining and canalling, have not only not joined the company in making the creek navigable, but have opposed and thrown obstacles in the way. We have been compelled to meet a jury of inquest, and contend against an attempt to assess damages against the company for running the works through the lands of one man who owned on both sides of the creek. The importance of the subject—its great utility to the general interest of society, must be acknowledged by all. I have always been of an opinion that the legislature are as much entitled to act on the subject of swamps as millponds; and on revising the Virginia Code, I find very many excellent regulations relating thereto: but like too many of our best measures, they remain a dead letter in the statute book.

"In the case which you have illustrated, there appears to be the highest equity, that E should be in some way compelled to yield to the paramount interest of his four neighbors. "To use your own so as not to abuse your neighbor," is the language of the common law—and I say, of common sense and equity. The courts should act on these subjects in the liberal spirit of guardians of private and public right both; and both might be made to harmonize in the management of clear heads and sound hearts. Upon the whole, I consider the subject as deserving much more specific enactments of the legislature, and much more pointed notice of the grand juries and courts; but that bug-bear "infringing private right," scares them from it, and the whole subject is generally overlooked. This is a case wherein the spirit of gospel morality displays itself in its native beauty and grandeur—"Do unto others as ye would they should do unto you." If such were the universal practical disposition of mankind, what radical changes should we not immediately see in the movements of human society?"

I am decidedly of an opinion myself, that legislative interference is indispensably necessary to the promotion and regulation of a proper and useful system of ditching. Upon every stream worth the labor of draining, there are more or less persons owning land thereon, as the water-courses were made the line of demarkation between tracts of land. The tracts are often owned by orphan children—also by old *women and contrary and obstinate men*, whose pride and delight seem to indulge in their invested power to throw obstacles in the way of those who wish to reclaim and improve their land.

Since 1826, I have been steadily and gradually engaged, more or less in ditching. E was the person who would not give us the fall. He has since died, and I became the purchaser of his land. In all probability, I have had more difficulties to encounter in ditching, in a small way, than any other person in Nottoway county. The Birchen creek, on which I reside, I expect has afforded as much good high land as any stream of the same size in Virginia. It was early settled, and with an unsparing hand our forefathers cut down and laid waste the greater part of the high land, the soil of which now lies on this stream. Within the last few years the owners have been very much engaged in ditching and improving it, and with the exception of one man's possession, (which is of no very considerable consequence,) the whole of the Birchen creek for eight or nine miles will very soon have a ditch averaging from ten to twelve feet wide, and depth sufficient to reclaim it. Some

of the owners have rendered their low grounds very productive and valuable. One of my relations cleared a piece of about ten acres of this land, and continued it seven years in succession in tobacco; from three to four plants of which generally made one pound. The next year (the 8th) he seeded it in wheat, but so luxuriant was its growth, that he made no wheat worth cutting. Many of the straws were from eight to ten feet high, and large in proportion, (almost incredible, though a fact.) The last and present year, (9th and 10th,) this piece of ground was put in corn; both years it produced abundantly—the last equally as good as the first year. It will be planted again the ensuing year in corn.

This is not the only valuable advantage derived from the draining system. It has made every family contiguous to the creek nearly free from autumnal fevers. On this stream there were three large marshes; in fact two of them formerly had been mill-ponds. In their former situation, these places harbored muskrats, minks, rackoons, otters and wild ducks, in abundance; and during the winter season afforded good sport for the huntsman. The spring brought trouble and loss to the farmer. He was at this season busily and actively engaged in watching his cattle, to prevent their dying in the *quagmires*. When he planted his corn, the strictest attention was required to prevent the black birds from pulling it all up. About water-melon time (say August,) until about the first large frost, mothers and their house-gang were pretty much engaged in providing the ways and means to prevent the moschetos from entering their houses at night to molest their "little ones." I can well remember when I was a boy, that my mother in the moscheto season, would have the windows and doors shut, and at times keep tobacco smoke about the house to drive off this troublesome little animal. Since reclaiming these marshes, the health of the nighborhood has greatly improved, and we now rarely meet with a case of the old-fashioned ague and fever.

I tender respectfully my salutations to your correspondent who writes under the signature of R. N., hoping he will continue his observations on draining, &c. I am more fond of hearing a sermon when I can see the preacher's face. I am more fond of reading essays when the signature is in *propria persona*. I may hereafter say something in relation to the different kinds of soil on low-grounds, and its adaptation to the growing of tobacco, corn, wheat, oats and turnips.

P. W. HARPER.

Green Field, Nottoway Co.
28th Dec. 1833.

MINERAL RESOURCES OF VIRGINIA.

From the Richmond Enquirer.

The following communication is certainly on a most interesting subject, and is from the pen of one of the most accomplished mineralogists in the United States. He is well known as the editor of the Geological Magazine of Philadelphia—and no man in this country is more capable of appreciating our invaluable mineral resources. Many of the facts which he relates in this letter are new and important—and his general views are striking, and entitled to great consideration.

Fredericksburg, Dec. 4th, 1833.

To JAMES MADISON, Esq.

Dear Sir,—I had the unfeigned pleasure of receiving your letter, respecting the proper manner of opening to the public the extent of the mineral resources of Virginia. I beg to assure you it is particularly gratifying to me, to find your opinion of the utility of a measure we have so frequently conversed about, entirely coinciding with my own. I sit down most willingly to give you a sketch of my opinion of those resources, and of a worthy and practical manner of developing them. It is too important a subject to be well examined in the compass of an ordinary letter; but I will endeavor to make it as little tedious as possible.

It happens opportunely, that the governor of this state, in his recent message, has recommended the very measure approved of, a geological survey, to the legislature. Such a measure has already been authorized by the legislatures of Massachusetts and Maryland: and I have for some time perceived a strong feeling in favor of it has been rapidly growing up in this state. This comes in the natural order of things. Formerly, this country presented the spectacle of an immense territory, with a small population sparingly scattered on its immense border. Now, its condition is greatly changed; for, although the impressions of the revolution are still fresh upon all minds, as if all had been contemporary with it, we have the energies of a nation, numerous and powerful in extenso, forcibly displaying themselves on every side. Some of the cities are growing up into the first class of magnitude, and the general wants correspond to the increase of numbers. Those labor-saving machines, canals and rail-roads, are gradually extending themselves over the face of the country; and the distant agriculturist finds, in the facilities they give him for the transportation of his produce to market, a compensation for his former high prices.

But corn, wheat, and edible commodities are not the only things human ingenuity can produce; and the day has passed by, when the value of an acre of land was to be estimated solely by the number of bushels it would produce. That square acre goes down in a solid mass towards the centre of the earth, and the wants of man and his curiosity will not permit him to rest, until he knows, to a certain extent, what that mass consists of, and to what useful purpose he can apply it. Geology is the science which enables him to gratify that curiosity.

The ancestors of the present generations knew not, two hundred years ago, the wants which press upon their descendants; they were few in number, and their greatest anxiety was for a secure and abundant means of existence. They held the country when it was in its infant state, but their children enjoy it in the mature state; and the boy's wants are almost forgotten in the urgencies of those of the man. Yet, most happily, the easy means of satisfying them exist. The wise dispensations of our Creator have provided those for every stage of society; it is man who is to blame, if, having health, he consents to remain poor and miserable; and the same may be said of communities of men, who disregard the resources which are benevolently placed within their reach.

It has often been remarked as a surprising circumstance, that the early settlers of Virginia seem never to have suspected the existence of gold in

the state, which we know at this time to be very extensively diffused across its whole territory. Considering how much of it has been found of late, it does appear to want some explanation; but perhaps this may not unreasonably be found in the very woody state of the country, and in the exclusive occupations I have alluded to. It is necessity which is the mother of invention, and they were not under the immediate necessity of looking for it. In Chesterfield and Henrico counties, which are nearer to the first communities of the Ancient Dominion, bituminous coal crops out on the surface very obviously; these indications could hardly escape their notice, or be misunderstood by them, as they came from a country where coal was already in domestic use. But in none of the ancient records of Virginia that I have seen, is this coal alluded to; and the reason it had no importance in their eyes, most probably was, that their fuel was the wood from which they were obliged to disencumber the ground to plant their corn.

Things which they could put to a profitable use we find did attract their attention. We have the proof of this, in the use they made, as far back as 1619, under the government of Sir George Yeardly, *of white and blue fossil marl*, for the purpose of manuring their lands, and by the aid of which they obtained wheat at the rate of thirty bushels to the acre. But granite and other stones of construction, soapstone, porcelain clay, and other numerous mineral substances, now having an intrinsic value, they paid no attention to. Most probably it never occurred to any of them, that a breakwater would be constructed at Cape Henlopen, for the protection of the future navies and commerce of their country: much less could they suppose that the rocks for its construction would be brought from the neighborhood of Wilmington in Delaware, and some of them from the banks of the Hudson river. *There is not a stone in the earth but is there for a wise purpose*, and it is our ignorance and indolence which make us blind to this important truth.

It has been acknowledged by the most eminent writers, that the prosperity of Great Britain is mainly founded upon her mineral riches. The substitution of human ingenuity for manual labor, is the distinguishing character of modern times; but all the complex and multifarious machinery of her manufactories, cannot operate without steam, nor can this be gathered without fuel. The main source, then, of the wealth of that country, is coal: without it, the cloths, the cottons, the iron, the cutlery, the pottery, and a hundred productive branches of art, would cease to exist there, and with them their immense commerce, and their powerful navy. But thirty millions of tons of bituminous coal, exclusive of non-bituminous or anthracite, are annually raised there, and every thing is prosperous: wealth increases, great public and private undertakings are projected and executed, and such is the demand for every mineral substance, that all receive an intrinsic value, sufficient to enable them to sustain even the expenses of a distant transportation. So true is this, that the flag-stones of the side-walks of the city of London, are brought from the northern parts of Scotland; and the granite used for the construction of the new London bridge, was imported from the same distant country. Every quarry, then, of mineral substances in that island, is a source of profit to its proprietor, supports the families of many industrious men and assists to maintain the great transportation interests which conduct the material to its destination; whilst these interests, to be permanently prosperous, depend again, where navigation is out of the question, upon well constructed roads and canals.

Here then we perceive the nature of the prosperity of that industrious country, and can no longer be surprised that geology, the science which teaches men how to judge from external indications the probable subterranean value of surface, should be so assiduously cultivated.

Let us apply, then, my dear sir, this useful lesson to the United States, and especially to the fine state of Virginia. The general complaint is, that the arable land is impoverished by our cultivation, and that the old class of wealthy proprietors, once the ornament of America, is fast disappearing. There is no doubt much truth in this, and it would present a melancholy perspective, if no remedy were apparent. But in relation to agricultural management, a great effort is obviously now making, to introduce an ameliorating and more systematic culture. It has already been attended with sufficient success to insure the confidence of the farming interest. This is a great point gained,—example going much farther than precept with farmers. Many of them are only to be diverted from their antiquated and unproductive practices, by being surrounded with successful examples. The more you talk to them, the more obstinate you make them, their minds being pre-occupied with the notion, that you want them to seal their own humiliation by surrendering their judgment to yours, and this they will not do. But make twenty-five bushels of wheat, where they only make ten, and let them see numerous instances of this, and they will soon come to. I think therefore the agriculture of the state is in a progressively improving condition, and that ere long the beneficial effects will be generally felt and acknowledged.

In the meantime, it has been ascertained from the very superficial examinations the state has received, that its mineral resources are not surpassed by those of any state in the union; and yet nothing has been done to develope them, and make them part of the active wealth of the country. Does this supineness proceed from rational doubts that the results would be problematical? What evidence, and whence derived, have we of the probability of this? Public patronage has not yet been extended to any branch of this important object; and private enterprise, where it has been guided by sound discretion, as in the instance of the bituminous coal-pits of Chesterfield county, has been brilliantly rewarded. But let us suppose the whole district, in which this valuable coal field is situated, to have been so deeply covered with other mineral substances, that no external indications had presented themselves, and that the coal, as frequently occurs, lay below the depth of the wells of the country, and we may fairly suppose that that coal field would not have been discovered unto this day. In the absence of public patronage and private enterprise, the same supineness that condems so many other mineral products to their subterranean obscurity, would have also included it. But nature there gave a hint which could not be mistaken; the coal cropped out conspicuously on the surface, and could not be neglected. May we not reasona-

bly conclude then, that other coal fields, now hidden, but lying contiguous to the navigable waters of Virginia, exist? Certainly, as far as my observations have gone, there are many encouraging indications of such deposites. And what is here said of coal, may be said of salt and other valuable mineral substances, on both sides of the mountains. How are any of them to be found out, if they are not looked for, and by persons trained and accustomed to investigations of that kind?

The cultivation of the science of geology has produced this immutable truth, that all the mineral and metallic substances in the earth, are not accidentally and irregularly distributed where they are found, but that they have been brought into their places by laws as unchangeable as any other natural laws. Hence, the practical geologist, familiar with the structure of the crust of the earth, is able to say, from the inspection of any one of its numerous beds, what its relation is to any of the other beds: whether, for instance, it is above, or whether it is below the coal, and this with as much accuracy as he can tell whether any particular letter of the alphabetical column is, when in its proper place, above any other given letter, or below it. Without this knowledge, he might dig for coal, for salt, or any other substance, though rocks lying far beneath the proper place belonging to those minerals in the crust of the earth. And this has often been done, to the great loss and disappointment of the undertakers. It is thus that geology enables us to apply our acquaintance with the laws of natu e, to proposes intended to be conducive to the prosperity of the human race.

Since, then, unquestioned indications exist in varions parts of Virginia, of coal, of iron, of gold and silver, of copper, of salt, of lead, and of other mineral and metalic substance, can any satisfactory reason be given, why the state should not engage in the execution of a project of such incalculable importance to her prosperity, as a detailed geological investigation of her whole territory, and the subsequent construction of a geological map, of a commensurate scale, upon which the exact localities of all her metals and fossil manures should be accurately laid down, with their geographical elevation, their direction and bearing, their extent and qualities? Will it be disputed, that a map of this character, accompanied with a lucid detailed report, constructed by competent persons from personal investigation, would be invaluable, and do honor to the period when its construction was authorized? Never can such a project be sufficiently appreciated until it is executed; then only would men unite in expressing their astonishment that it had been neglected so long. Is it not manifest, that in the natural progress of things, such a project should precede, and not follow, a general system of internal improvements; it being of the last importance, that the direction given to the routes of canals and roads of every description, should be much influenced by the local position of mineral and metallic beds, and that they should not be influenced altogether, as they still continue to be, by the physical geography of particular lines of direction?

But I am conscious it is unnecessary for me further to urge these considerations upon your enlightened mind. I have been insensibly drawn into an unwonted length on an important subject, and have but very little room to advert to a most interesting locality of the metallic resources of Virginia, now known as the gold region. I imagine a great misconception exists in the public mind in relation to this subject, and I am happy that the information it is in my power briefly to communicate, is founded upon repeated personal investigation. I had conceived, some years ago, the plan of executing a sketch of a general geological map of the United States; but, after great devotion to the pursuit, by preparatory studies in Europe and this country, and a great expenditure of time and money, I have given it up, satisfied that it is a task far beyond the powers of an unassisted individual. The last two years, my investigations have been principally limited to Virginia, and unconnected with any individuals whatever, as I always have been, and still am. I have, during this period, made myself familiarly acquainted with every gold vein that has been worked in the state. To this period of my life, I shall always look back with pleasure; every facility has been extended to me by the most grateful hospitality from every quarter. If language were not inadequate to express what I must always feel on this subject, a delicate respect for the generous minds to whom I feel under such deep obligations, would, at any rate, impose silence upon me.

Interesting as the study of these veins has proved to me, and full of instruction, it is not upon this occasion I can enter into a scientific relation of their structure, and mineralogical characters. It must suffice me to say, that some of them present occasionally, the most surprisingly beautiful and rich specimens of ore; where the quartz contains from ten to forty per cent. in weight of native gold, so pure, as to rise as high as twenty three to twenty three and a half carats. In some instances the gold is found alloyed with silver, and in others I have found not inconsiderable quantities of a variety of red sulphuret of silver. Tellurium also is not uncommon; to these may be added sulphuret of lead, pyritous copper, and, though rarely, beautiful crystals of fibrous malachite. The sulphurets of iron are extremely abundant. In the most celebrated national collections of Europe, most of which I have visited, I have never seen ores more remarkable for richness and beauty. The rarest are from Orange, Spottsylvania and Culpeper, where considerable developments have been made, and I am sure that no mineralogist who could have an opportunity of examining those I have seen, would hesitate to agree in the admiration I freely bestow upon them. It is true, they are not of very frequent occurrence, but still they are met with under circumstances, which hold out great encouragement to pursue the veins, far beneath the superficial depths that have been yet attempted.

The nature, too, of the alluvial deposites of gold, strengthens, in a remarkable manner, the encouragement given by these indications. Nothing can be more certain, than that the precious metal found in these, is derived from broken down quartz veins, and slate veins containing seams of gold, lying in the vicinity of the deposites. I can give you a recent gratifying instance of this. The proprietors of a deposite in the county of Lousia, which had been for some time productive, came unexpectedly upon a very rich bed of gravel, which yielded them in six days, near ten thousand dollars in fine gold. And this is no illusion: for I have had an opportunity of seeing the gold, and of

examining and comparing it with specimens of the vein from whence it was derived, and which they have also had the good fortune to discover contiguous to the deposite. The rock is a pale porous quartz, thickly studded with knobs and laminæ of gold, which correspond exactly in form with the particles found in the bed of gravel. The same correspondence I have often observed in other localities, and especially at Greenwood in Orange county.

But it is not such rich specimens of rock alone which form the temptation to enter upon systematic mining; for, I have seen many veins in Fauquier, Stafford, and other counties, where gold is invisibly combined with the sulphurets of iron and copper, and very extensively with pure quartz, so as to yield, when treated by proper processes, from one to six pennyweights for every bushel of ninety six pounds weight. The minimum of these rates would be considered a profitable ore. There have been various attempts to extract the gold from ore of this kind, upon a somewhat large scale; but the want of practical knowledge in metallurgy, the defectiveness of the process applied, and the novelty of the undertaking, conducted in most instances by persons unacquainted with the art of reducing metals, have hitherto produced a few failures in the experiments attempted; these, being greatly exaggerated and much misrepresented, have had the effect of checking the disposition which had arisen amongst capitalists, to come forward in aid of this branch of industry, by establishing the most promising of these mines upon regular systematic principles.

A gold mine, projected with judgment and conducted with skill and economy, is but a manufactory of a particular kind, which gives employment to laborers, who are fed and clothed by other branches of industry. Whatever gives honest and constant employment to the laboring classes, is a blessing, enabling the laborer to support his family, whilst his employer draws a profit from his industry; but in Virginia, where labor and food are comparatively so cheap, and where the main strength of mining labor would soon be as advantageously drawn from colored men—and this I have had evidence of—as from the lower class of whites, mining would be a new and invaluable direction to turn her surplus labor into. But the great lever, capital, still is wanting; and without it, nothing can be done.

The auriferous veins appear to maintain a steady continuity towards the centre of the earth; and to sink a shaft of sixty feet, and construct a tunnel to intersect it, is a mere superficial operation, to which, for the want of capital, the operations now in progress, are necessarily limited. If the vein is to be tried at lower depths, a steam engine must be employed to keep the works dry; and if favorable indications encourage the proprietor to construct galleries parallel to his veins, he soon finds that his unaided efforts are insufficient; that he is doing nothing for his country, and is embarrassing himself; that to carry his mine on upon well-approved principles, he must have the aid of a capital which will enlarge his business to the required scale, and bring experience and practical science to the management of it. Private partnerships are subject to so much inconvenience in similar undertakings; it is so difficult to withdraw from them when great interests are embarked, and death so often enhances the difficulty, by making it impossible for the survivor to separate his interest from that of inheriting minors, that it is seldom one or two individuals can be found willing to risk the required amount.

It is by incorporated companies alone such undertakings can be profitably established. A hundred individuals will cheerfully divide a risk, that may appear formidable to a few; if the undertaking succeeds, a hundred are gratified; if it fails, no one is seriously injured; whilst in both cases the public industry is encouraged. And this, in my opinion, is the true policy to be adopted by the state, viz. to encourage capital to come from a distance, to develope her dormant resources. I speak guardedly when I aver, that if the capitalists of England had entertained as favorable an opinion of the gold and copper lodes of Virginia, as they deserve to inspire, that in 1824 and 1825, when from twelve to fifteen millions sterling went to South America to re-establish the mines, at least two millions of that amount might have been placed in Virginia, if her gold veins had been discovered.

Some philosophers are feelingly alive to the danger of encouraging foreign money to come into the country; foreign labor in the disguise of cloth, cotton, cutlery, pottery, may come, although a substitute for native labor; but foreign money, to pay American labor, that may not come. I venture, however, to predict, if ten millions of dollars are ever placed in Virginia, for the purpose of bringing her gold and silver, her copper and other valuable minerals and metals to light, that the prosperity will be so universally enjoyed as to leave the alarmists in a very feeble minority.

And indeed, although little more than two years have elapsed since gold has been much talked of, as a product of Virginia, she has been already benefitted by the exertions that have been made. I have been informed by authority I know to be undoubted, that northern capital to the amount of more than one hundred and fifty thousand dollars, has been expended in two or three counties in the mining interest; and that seventy thousand dollars in bullion, cast from gold found in Orange, Louisa, Spottsylvania and Culpeper, within the present year, have passed through one Bank in Fredricksburg, exclusively belonging to native citizens of Virginia. It is then, an incontrovertible truth, that the employment of capital on a larger scale, may greatly benefit the state, and that by adopting a wise policy, she may become to this country, what Cornwall is to England, the seat of prodigious industry, and the source of much individual and national wealth. Let but one incorporated company succeed, and confidence will immediately spring up. Capital will flow in—real estate will rise to its value—surplus labor will be in demand—and the Ancient Dominion will become what she ought now to be—a prosperous mining country.

Permit me now, my dear sir, to add my most cordial wishes for your uninterrupted health and comfort, with the assurances of my being,

Most respectfully,

Your devoted and faithful servant,

G. W. FEATHERSTONHAUGH.

For the Farmers' Register.

THE IMPROVEMENT OF LANDS IN THE TOBACCO REGION OF VIRGINIA.

The importance of improving the exhausted lands of middle Virginia is now felt and acknowledged by all; and the inquiry has of late been frequently made, in our hearing, what general system should be adopted to promote this end. We have no mineral manures—a great portion of the soil has been washed away from our rolling lands—our flat lands are well nigh exhausted by hard cultivation—and the general cry is, "who can show us any good?"

We propose in our humble way to point out the causes of the present worn-out aspect of our country, and then to suggest an antidote against farther deterioration, and also the means of an entire resuscitation.

We believe that *injudicious grazing, and the want of proper enclosing*, has contributed more to the impoverishment of our soil, than all other causes combined. This defect in our agricultural system has been long seen and regretted by intelligent farmers; but as the system is still persevered in, against reason and interest, the general error is a sufficient apology for urging its abandonment, although we may furnish no new reasons for adopting a different system. We will not at this late day point out all the inconveniences that follow in the wake of what is called the "three-shift system" of Virginia. To show however that grazing injudiciously has mainly contributed to the destruction of our soil, we will detail some of the mischiefs of regularly grazing arable land, as soon as the crop is taken from it.

The productiveness of a soil depends principally on the quantity of nutritive matter contained in it, and on a proper degree of openness, so as to afford a soft bed for the penetration of the roots of vegetables. Grazing cultivated lands lessens, in a constantly increasing ratio, the quantity of this nutritive or vegetable matter, and also makes the soil close and impervious to the roots of plants. The most apparent injury is the destruction by cattle of the voluntary crop of grass and weeds, that land in tolerable condition will throw up after a wheat, oat, or other grain crop is severed. Every green thing, by a large stock of cattle, is frequently entirely destroyed: what escapes the mouth is trodden down by the hoof; the restlessness of hunger keeps the stock in perpetual motion, and the field soon becomes naked and hard, and in the most proper condition to have its juices extracted by a summer's sun. The capacity, therefore, of land, under such a system, for producing, is constantly diminishing, until entire sterility is the result. The face of the country around us confirms the truth of the above remarks; for notwithstanding much land has of late years been cleared for tobacco, and subsequently put in corn, still the average corn crop in this vicinty is supposed to be about a barrel and a half or two barrels to the acre.

But it is a consoling fact to the farmer that his lands may be brought back to their original fertility in almost as short a time as served for their destruction, provided the opposite, or non-grazing system, is adopted.

The atmosphere, with us, may be considered our only source of manure. I do not wish to abolish the distinction of artificial manures, or to disparage their virtues; but the planter should bear in mind that the straw that feeds his stock, and the grain that supplies his horses with food, derive the most of their existence from the atmosphere; and that the dung of animals fed upon these articles, will manure less land than the rough food itself. But to return more particularly to the support of our second position. It is a well known fact that some plants, (the house plant for instance,) derive the whole of their nourishment from the atmosphere. Others derive a fourth, a third, a half, or three-fourths—the proportions of food supplied by the earth and air depending on the nature and structure of the plant. But from experiments made by agriculturists, it may be safely affirmed that one half or two thirds of the spontaneous growth of an enclosed field comes from the atmosphere. According to this idea, an enclosed field would have its productive capacity sufficiently increased to double its crop in two years, which no doubt accords with the observations of many planters who adopt the enclosing system. The writer of these lines has been informed by several gentlemen of the county of Charlotte, that three or four years rest without grazing has reclaimed lands in their possession from a state of complete exhaustion, so as to produce from five to seven barrels of corn to the acre. The lands referred to, however, were originally good river bottom.

The objections to the enclosing system are, 1st. that too much land lies idle, and that the planter is deprived of the yearly benefit of his capital: but it has been repeatedly ascertained and shown by late communications to the Register, that one acre properly rested and enclosed, will produce as much as two or three under the present grazing system. An acre of land, capable in its virgin state of producing five barrels of corn, if rested every other year, will never deteriorate—(I make this assertion from my own observation;) and I have no hesitation in saying, that if cultivated and grazed alternately, the crop would be lessened at least a barrel every time it is cultivated. The aggregate amount then of corn produced on the rested acre in five years, would be twenty five barrels—on the grazed acre fifteen barrels; and the rested acre would be left with a capacity of still producing five barrels, while the grazed acre would be exhausted and unfit for cultivation.

Another objection to the enclosing system is, that it is incompatible with a good stock of cattle, a plenty of butter, milk, &c. But we have no hesitation in saying, that almost every planter of our acquaintance has at least double the number of cattle that they ought to have, in the present unimproved condition of their farms. The quantity of food that now on some farms barely keeps alive twenty head cattle, would keep ten fat. Dean Swift remarked of his countrymen, the Irish, that their pride preferred two poor cows to one fat one, with half the quantity of milk. The remark applies with a good deal of aptness to Virginia farmers.

The reason I have not recommended a clover lay as a substitute for a voluntary crop of vegetation, is the known incapacity of a great portion of our lands to produce red clover; but as soon as proper rest increases its fertility sufficiently to produce clover, we would recommend it as a more fertilizing growth. A considerable portion of lands

of middle Virginia have grown up in what is called broom straw; land in this condition we do not believe would be improved by rest. The broom straw draws most of its nourishment from the earth, and its substance evaporates before it falls, and its return is very meager. All such lands should therefore be ploughed up and cultivated, and suffered to rest without grazing—for as far as our observation extends, the broom sedge is produced principally by grazing.

In conclusion, I will give a short abstract of the manner in which I believe a plantation or farm should be laid off and cultivated. I do it however with great diffidence, inasmuch as my views are not so fully confirmed by experience as I would wish; but, as far as my observation and experience has extended, the remarks in the sequel are strictly true, and I have asserted but little from inference or conjecture.

Let us suppose the plantation to be cultivated to consist of four hundred acres of cleared land. Such a plantaton, if in tolerable heart, would employ ten laborers. The planter's first object would be to enclose the four hundred acres under one fence, and then to select about eighty acres of the most hilly land, lying in a body, for a standing pasture, which he would separate by a good fence from the remaining three hundred and twenty. He should then divide the three hundred and twenty acres into four equal parts, each containing eighty acres. These divisions would require no additional fencing. The average tobacco crop is supposed to be about eight thousand to the hand: with ten hands, twenty acres would therefore be the yearly crop, counting four thousand hills to the acre. The next object of the planter should, therefore, be to lay off twenty acres from each of the eighty-acre divisions for a four-shift rotation for tobacco. The remainiug sixty acres in each of the eighty-acre divisions would serve for a four shift system for corn. Ten hands cultivating ten thousand corn hills per hand, five feet apart, would together cultivate sixty acres. My ideas would be more intelligible by referring to the following plan.

Standing Pasture—80 *acres.*

Tobac. lot. 20 acres.	*Tobac. lot.* 20 acres.	*Tobac. lot.* 20 acres.	*Tobac. lot.* 20 acres.
Corn. 60 acres.	*Corn.* 60 acres.	*Corn.* 60 acres.	*Corn.* 60 acres.

The system of fallowing for wheat, it is well known, is impracticable on a tobacco plantation; a profitable wheat crop however might always be produced by annually sowing down a corn shift the year that it is cultivated. One of the most important items in the system that we recommend is, that the planter should immediately go about setting the whole of his standing pasture in grass and this must be effected by yearly lopping off a part of the eighty acres appropriated for that purpose, enclosing it, and sowing it down in herds, green-sward, or orchard grass, until a sufficient number of acres are set in grass to support his stock: the residue of the eighty acres might then be converted into arable land, or the whole put in grass, and a much larger stock supported; for twenty acres of land well set in grass will support a sufficient number of cattle and horses for a plantation of the above description. There need be no fear that the tobacco lots will not be rich enough on the four-field system; if they are well clovered, they will rapidly improve under such culture.

PLANTER.

Charlotte County, Dec. 19th, 1833.

EGGS OF THE SILK WORM.

From the New York Farmer.

On opening a cocoon, and carefully taking off the shell of the chrysalis, the miller or perfect insect is exhibited entire. The inside of the miller appears to be composed wholly of eggs, without the least appearance of any other parts or members. It requires leisure and patience to ascertain the number of eggs in a single insect—a little more than we possess. Assigning the undertaking, therefore, to one of the fair sex, who sometimes to say the least, possess the above requisites, we found the number to be about three hundred.

A FAT HOG.

Fom the Nantucket Inquirer.

A porker was raised in this town during the past season, touching which we have the following particulars: weight, March 25th, 75 pounds; weight, December 16th, 470 pounds;—increase in 267 days, 295 pounds—or 23½ ounces per day. Average of corn consumed per day, 4½ pints.

A DESCRIPTION OF THE VALLEY OF THE KANAWHA, BY A LOWLANDER, IN A LETTER TO A FRIEND.

From the Richmond Compiler.

My Dear Sir,—You have often visited the mountain region of Virginia, and tasted of its various and unrivalled mineral waters. You have mingled with the fashionable throng at the White Sulphur,—regaled your palate upon the fine venision and other dainties of the forest, and bathed in the delicious fountain of the Warm Springs. You have never, I believe, however, extended your journey as far west as the *Valley of Kanawha.* The great state road which commences at Covington, and secures you a safe passage to Lewisburg, passing the gigantic Alleghanies at a grade which is almost level,—pursues its winding, yet steady course over ranges of lofty mountains, and through wild and hitherto unbroken depths of wilderness and shade. Now and then it courses along the margin of some rocky and stupendous precipice, often several hundred if not a thousand feet in depth,—and as the mail coach drawn by four spirited steeds, whirls you along the perilous cliff, you feel an involuntary shuddering at the slender barrier which separates you from eternity. The

blue mist which hovers along the yawning chasm beneath, and is visible through the variegated foliage, impresses the mind with vague and undefined images of danger; and indeed it would be well if the terrors which are sometimes inspired were those of imagination only,—for I have been credibly informed that in more than one instance, the lives of travellers have been exposed to imminent peril. At one of those narrow defiles, the spot was pointed out where the stage with eight passengers and driver rolled down a steep declivity of fifty feet. Fortunately the nature of the ground arrested its downward course, and still more fortunately, I had almost said miraculously, although the luckless vehicle turned two or three summersets and was actually shattered into fragments, neither horse nor passenger suffered material injury. Notwithstanding these disasters which occasionally await the traveller, this important and convenient highway which unites the east and west, is a noble monument of skill, enterprise and labor. In its vast utility to the country which it intersects, it may justly be compared to the introduction of steam navigation on our western waters. Distance and time are in a great measure overcome, or perceptibly diminished, and a journey which was once performed with insupportable fatigue and delay, is now achieved in one fourth of the time, and with comparative ease. Before reaching the Valley of the Kanawha, the traveller is feasted by the sublime and picturesque scenery from the cliffs of *New river*, which is one of the principal tributaries to the Kanawha. One of these cliffs, has been long known by the name of the *Hawk's Nest*—but more recently called *Marshall's Pillar*, in honor of the venerable Chief Justice who as one of the State Commissioners in 1812, stood in person upon its fearful brink and sounded its exact depth to the river margin. Every one has heard of the far-famed falls of Niagara—and yet I doubt if the beholder of that wonderful cataract ever experienced more of the true sublime, than the grand and elevating prospect from *Marshall's Pillar*, is apt to inspire. Imagine yourself standing upon the projecting point of a perpendicular rock, 1200 feet from the valley below. Before you, as you look to the east, the New river is seen at the distance perhaps of several miles, winding or rather rushing, tumbling, and foaming through the towering cliffs which environ it. Sweeping by the lofty promontory on which you stand, it suddenly turns its course in a south west direction, and presents in the whole distance, several beautiful cascades, which send to the listening ear the far off, but lulling sound of their waters. The cliffs themselves, judging by the horizontal and corresponding strata of rock on either side, seem to have been originally united, but torn asunder by some strong convulsion of nature, in order to give free passge to the narrow but angry torrent which rolls majestically at their feet. The autumnal season gives to this imposing picture a magnificent and gorgeous drapery, of which no man whose vision has been confined to the lowland scenery has the slightest conception. On one side a dark outline is defined by the shadow from the opposite cliffs, which, leaving the base of the mountain of a sombre brown, presents its summits shining with the rich and mellow tints of an October sun. In gazing from the dizzy height where the spectator is perched amidst sublime and solitary deserts, it requires but little effort of fancy to portray the haggard and inspired bard of Gray, standing

> "On a rock whose haughty brow
> Frowns o'er old Conway's foaming flood."

No hostile Edward it is true, is marching through this wilderness with his embattled legions, to victory and slaughter; on the contrary, a profound stillness prevails, which adds interest and solemnity to the scene—a stillness which is disturbed by nothing save the scarcely audible murmurs of the distant wave. So sublime indeed is the elevation of the cliff, that whilst nothing seems easier than to cast from its beetling verge, a pebble into the bed of the river, the most powerful arm is often foiled in the attempt.

After feasting on the sublime repast which nature spreads before the eye of the tourist on these romantic cliffs, he is better prepared to enjoy by contrast his descent into the fertile and lovely vale of the Kanawha. That beautiful stream is formed by the junction of the Gauley and New rivers, at the base of the Gauley mountains. A short distance only below the poiur where their waters mingle, the ear of the traveller is saluted by the roar of the Great Falls—a fine cataract of twenty-two feet over a natural dam of rock which spreads irregularly across the Kanawha. I should judge from the sketches of the Great Niagara, by artists and picturesque tourists, that this was its copy in miniature. Certain it is, that on approaching the cataract which you can easily do, over the vast masses of naked rock, which rise from the bed of the river—you feel the effect of the spectacle in all its sublimity. I will not say as Byron said of the cascade of Velino, that it is "horribly beautiful"—or that

> "An Iris sits, midst its infernal surge,
> Like hope upon a death bed."

But whilst there is nothing which awakens infernal images in the cataract of Kanawha, I saw distinctly the rainbow reposiug its brilliant arch upon the white foam of the waters. Whatever disappointment, however, the limner might experience in his visit to this interesting spot, the epicure would meet with none at the spacious hotel which stands opposite the falls. To all lovers of the finny tribe, it is a perfect paradise. Here are fish, which if not unknown, are yet untalked of on the borders of our Atlantic streams. The delicious black perch, the grennel, the blue cat, the fine-flavored buffalo, and a species of sturgeon, all abound in profusion, and all present their respective claims to preference. If to these luxuries of the water, be added wild fowl, and forest game, which are found in abuudance, the most fastidious gourmand might desire no higher fruition than is afforded in this favored region.

For many miles after leaving the falls, the Kanawha Valley is narrow, winding, and unprepossessing. Its gigantic and various growth is indeed interesting to the lowland traveller—and the vast masses of rock, which tower in magnificent pride to the very summit of the mountains, are objects of curiosity and attention. At the same period in autumn, nature was perceptibly not so far in the "sear and yellow leaf," as in the more mountainous and elevated region. Her robe was fresher and greener, but yet there was not wanting that splendid variety and intermixture of colors which distinguish the western forests. The bright

orange or golden yellow of the linn, the sugar tree and hickory, were beautifully contrasted with the evergreen laurel, and with the dark and mournful hemlock. Now and then some parasitical creeper could be seen winding its brilliant red among the branches of a lofty tree of different foliage—and the gay and graceful sumach would hang out its crimson drapery to delight the beholder. Unlike the lowland shrub of the same name, the sumach of the west is admitted into the family of trees; and so I presume it is in England, for otherwise the lines of Moore would not be intelligible.

In the shade of yon sumach, whose red berry dips
In the gush of the fountain, how sweet to recline.

Lovers unless they belonged to the race of pigmies, could hardly recline in the shade of one of our dwarfish sumachs in eastern Virginia.

It is nearly twenty miles below the falls, before the Kanawha Valley widens into something like a plain, and opens its beautiful vista to the eye. The mountains which enclose it on either side become gradually depressed into hills—and for the first time, the dense, dark volumes of smoke which ascend from the salt furnaces, announce the busy and bustling scene which enlivens the highway to the village of Charlestown. What a scene of animation indeed, contrasted with the deep solitudes from which the traveller has but just emerged. Here he is feasted with a continued succession of green meadows and cultivated fields teeming with flocks and herds, and adorned by commodious and even elegant mansions. The chimneys of the salt manufactories pour forth, at short intervals of space, their curling masses of black vapor, whilst swarms of laborers and others connected with these establishments, are continually passing to and fro, presenting a pleasing *coup d'œil* of incessant activity and industry. Nature indeed seems to have been prodigal in her bounties to this interesting region. The contiguous forests having been almost stripped to supply fuel to the salt furnaces. That precious mineral so necessary to human comfort, must have remained forever useless but for the discovery of inexhaustible beds of coal, so convenient of access as to make the cost of procuring it scarcely worth considering. Sometimes, by suitable platforms and inclined culverts it is thrown from the mountain side immediately to the door of the manufactory, and when more remote from the place of consumption, it is transported with equal ease in wagons or cars over rail-roads constructed for the purpose.

The whole product of the salt district, is estimated at 1,200,000 bushels annually—and this product, must continue to swell with the increasing demand, and the employment of additional capital. It is a curious fact, and worthy of philosophical inquiry, that whilst the salt water is obtained by boring at a depth of from 3 to 500 feet below the bed of the Kanawha, it invariably rises to a level with the river. When the latter is swollen by rains, or the redundant waters of its tributaries,—the saline fluid enclosed in suitable gums on the shore, ascends like the mercury in its tube,—and only falls, when the river is restored to its wonted channel. How this mysterious correspondence is produced, is a problem which remains to be solved. Theories and speculations I have heard on the subject, but none seem to me to be precisely consonant with the principles of science.

Immediately on the road and a short distance from the bank of the river, the celebrated *Burning Spring* attracts the curiosity of the traveller. A cavity in the earth, of a few feet in diameter, presents at its bottom numerous small orifices from which an odorous gas, or strong bituminous vapor, is constantly exhaled. When ignited by a lighted candle, which is easily done, the whole becomes a sheet of flame, and is only extinguished by the plentiful application of water. Filling the cavity with water previously to ignition, does not diminish the brightness or fierceness of the blaze. Inflammable gases undoubtedly abound in many portions of the valley. An anecdote illustrating the fact, was frequently related in my hearing, which I cannot forbear to repeat. A very respectable gentleman, somewhat eccentric, and a little profane, had been boring for salt to the depth of 600 feet, when his friends endeavored to dissuade him from the costly experiment. "Salt I will have" he exclaimed, "if I bore for it to the infernal regions!" Accordingly he pressed on in pursuit of his object—with renewed perseverance and ardor—and his boring machine having penetrated one of those subterranean recesses, where nature generates her mysterious and terrific agents—a volume of flame suddenly burst through the orifice, and ascending far above the earth's surface, spread terror and amazement in the neighborhood. The less enlightened and superstitious of course, fancied that the profane gentlaman's threats had been really carried into execution, and that the contents of the awful and undefinable pit had been actually disgorged upon mother earth.

This charming country is not only rich in beautiful and picturesque scenes, but abounds in objects interesting to the naturalist and antiquarian. Besides its inexhaustible treasure of salt and coal, a quarry of fine marble has been recently found on the Elk river, and I doubt not that discoveries equally valuable would reward the diligent explorer. Specimens of slate stone, and other formations with impressions of vegetable remains, are common, and a gentleman of science and distinction informed me that coral had been found deeply imbedded in rock. Among the curiosities, may be mentioned *the calico and pictured rocks*; the former of which represents a succession of beauiiful and uniform figures, inscribed by some wonderful process of nature, and the latter which is evidently a work of art, exhibits a variety of rude sketches of birds, fishes and beasts—generally supposed to be, specimens of aboriginal sculpture.

There is, as I am informed, some miles from the bank of the Kanawha, a curious petrified tree, and the whole country is full of Indian fortifications and mounds. From one of these ancient sepulchres, an intelligent gentleman stated to the writer, that a human skeleton was taken not many years since, probably the remains of some distinguished chief, whose exploits in battle, or the chase, had won the admiration of his tribe.

Indeed there is no department of natural history which might not be enriched by valuable acquisitions from this and almost every other portion of western Virginia. The developement of its boundless mineral wealth would not only extend the borders of science, but materially subserve the useful arts and the interests of commerce. Let channels of inter-communication with the east be opened and multiplied by a liberal system of im-

provement—let a geological survey be authorized by the legislature, in imitation of the wise policy of Pennsylvania and Maryland—and the patriot will not yet despair of beholding this ancient and venerable state regain her lost rank in the confederacy.

Charlestown is a beautiful village, containing a thousand inhabitants. Its principal street extends about a mile on the bank of the Kanawha, and is terminated by the Elk, which flows nearly at right angles into the former stream. Indeed, there is something like enchantment in the contrast of this flourishing village, with the wildness and solitude of the same spot, less than thirty years past. The panther and wolf have been driven from their savage haunts, by the march of civilization and refinement—and where a few scattered log huts once arrested the traveller's eye, he now sees commodious and elegant buildings, the abodes of comfort and even of luxury. There is one drawback indeed from the pleasures of sense and taste which the sojourner is obliged to experience in the scarcity of potable water. The hills do not supply that indispensable necessary of life; and the inhabitants are reconciled by custom to the use of the river. The Kanawha, is indeed, lovely to the eye, when its naturally green suaface, reflects a deeper emerald from the lofty foliage on its banks; but its water is so strongly impregnated with minerals, to say nothing of other and obvious causes of dislike, that to my palate at least, it was utterly distasteful.

In enjoying the pleasures and advantages of safe transportation along the great state road, which traverses this section, there is a spectacle often presented, which awakens a melancholy train of reflections. I allude to the number of emigrants who allured by the hope, sometimes deceptive, of improving their condition, are bending their toilsome march to the far west. Imagination becomes busy in conjuring up the broken ties of early association, of kindred, and country—and we read in the sorrowful visages of some of these wretched fugitives, tales of mental and bodily suffering, which no language can express. It is true, that some of these numberless caravans, present the exterior of comfort and even of happiness; but for the most part it is evidently the last struggle of despairing poverty, to escape from the hardship of its lot. Whilst the philanthropist shudders at such scenes of wretchedness, the politician must mourn over this unceasing drain to population as well as the causes which produce it. I trust, at least, if the wave of emigration must continue to roll westwardly, that the time will shortly come, when the forests and mountains of our own commonwealth, will present sufficient attractions to break its force, if it does not entirely arrest it.

But my letter has been spun out to a tiresome length, and I must draw to a close. If I have interested you enough to induce you to prolong some of your summer excursions, I shall be amply repaid, and you will never regret having visited THE VALLEY OF THE KANAWHA. J. E. H.

RAILROAD ACCIDENTS.

From the American Railroad Journal.

The late unfortunate accident on the Camden and Amboy railroad has caused many remarks on the danger of railroad travelling.

Although we admit that there may be danger in travelling on railroads at *high* velocities, we still remain of the same opinion, often expressed in this Journal, that the danger is not *as* great on railroads as on steamboats, at least at equal velocities. We are desirous however, to do all in our power to prevent accidents in either case, and therefore, it is with great pleasure that we lay before our readers the following communication from E. L. MILLER, esq., a gentleman of much experience and reflection upon the subject of railroads and steam engines.

Danger of Travelling on Railroads.

[For the American Railroad Journal.]

Since the late fatal accident on the Camden and Amboy railroad, the danger of this mode of travelling has become a common topic of conversation, and a subject of frequent remark, in our public journals, and the inquiry from all quarters appears to be, is there no way of preventing the recurrence of similar accidents?

In the few remarks I propose to make on the subject, I have not the vanity to expect that I can offer any suggestion which may produce this desirable result; the most that I hope to effect, is to call the attention of those who have the more immeditate superintendence ef these works, to some mode of obviating the danger, if, as I believe, this desideratum be attainable.

Fortunately passengers travelling by this improved mode of conveyance are almost wholly exempt from the danger arising from the explosion of steam boilers; not that the boiler of a locomotive is less liable to explode, than the boilers of other engines, but the small quantity of water it contains, and the distance that the passengers are removed from the boiler, render them in a great measure secure from this source of danger.

The principal danger to be apprehended arises from the breaking of either the wheels or the axles, from obstructions on the road, or from passing the turn-outs, and it must be very obvious that the danger in all these cases must be increased in proportion to the velocity. I have never been an advocate for travelling at a very high speed upon railroads, and believe that all their useful purposes may be as fully attained by a speed of twelve or fourteen miles per hour, as by the more dangerous one of twenty or thirty.

With regard to the wheels and axles, I have little doubt but a due attention to their construction would obviate most of the danger. Since the outside bearing on the axles has been adopted, in order to save friction, it has been common to reduce this part of the axle to an inch and a half, or an inch and three quarters in diameter. This would doubtless be sufficient if we could always be sure of the best quality of iron, and a perfect exemption from flaws; but as we can never be sure of these, would it not be advisable to sacrifice a little power to the increased resistance, and make the bearings of the axles $2\frac{1}{4}$ or $2\frac{1}{2}$ inches in diameter? If this were done, and the axle, faggoted from the very best quality of iron, they would possess so much extra strength as to render them *perfectly safe* under all circumstances, provided due attention were paid to keep them oiled.

With regard to the wheels, *cast iron should never in any case be used for passenger cars.* The altogether wrought iron wheels is doubtless the

most safe. Next to this is the wooden wheel, with wrought iron rims similar to those used on the Liverpool road, and adopted on the Camden and Amboy railroad. An interesting experiment is now being made on the Trenton road, of a new kind of wheel made of gun-metal, which is thought to possess so much tenacity as to render it safe from the danger of breaking, and if the abrasion is not too great, must be a very valuable improvement in wheels for railroad carriages.

The danger from obstructions in the road is in a great measure obviated by the guards which have been adopted on most of the engines, and as regards the turn-outs, the only security lies in passing them at a very moderate speed.

Now, as it is well understood by those familiar with the subject, that the danger lies not in the simple act of the car getting off the road, but from its being forced on in this situation by the momentum of the train, and the power of the engine, until the car is literally broken to fragments, and the lives of the passengers endangered, I would suggest to those having the management of railroads, that much of the danger to be apprehended in such cases might be obviated, provided some plan could be devised of attaching the cars to the engine, and to each other, which when the resistance became increased in a certain ratio beyond that required to start or keep them in motion on the road, the car to which any accident might occur, should be self-detached from those which preceded it. This idea has been suggested to my mind from having witnessed two instances of cars getting off the road. In one of these, the cars were attached to the engine by a rope, which broke the moment it met with increased resistance by the car getting off the road, and although this car contained thirty passengers, no injury was sustained except the breaking of the car. In this case I have not the least doubt that had the attachment of the cars to the engine been permanent, the car which was off the road would have been dragged on by the momentum, and the power of the engine, until it had been entirely broken to pieces, and most of the passengers killed or maimed. The other instance to which I refer occurred under similar circumstances, with this exception, that the attachment of the cars to the engine was more permanent, and the result much more disastrous, the carriage being entirely destroyed, and several of the passengers maimed for life.

To obtain this important desideratum in attaching the cars to each other and to the engine, I have thought that a spring might be used which should operate so as to detach itself whenever the power of traction was increased to a certain point; the strength of the spring to be graduated in proportion to the working resistance, those next the engine being the strongest, and thus having a proportionate decrease of strength, to the end of the train.

The importance of rendering this mode of conveyance, as safe as it is expeditious and convenient will, I have no doubt, call forth and enlist in its accomplishment the mechanical talent of the country, and it would afford me the highest gratification, if I could flatter myself that the suggestions I have here offered, should in the smallest degree contribute to this desirable result.

E. L. MILLER.

New-York, Nov. 20, 1833.

For the Farmers' Register.

GEOLOGICAL.

[*Continued from No* 8, *p.* 474,]

Another argument is brought forward by Mr. Cuvier, to prove that the species and genera of the ocean have changed. He thinks the remains of organized bodies found in various strata, differ from the animals which now inhabit the ocean. It is true there may be found in the strata organic remains differing from animals that now exist, but this does not prove a new race of beings: it only goes to prove that we are unacquainted with all the animals that inhabit the ocean. I am willing to admit that many animals are extinct that once inhabited the ocean, but am unwilling at the same time to believe that a new race, differing in genera and species, has been formed. Many species of land animals have become extinct; this is proven from the great number of large bones found in high latitudes. If they are not extinct, they must have dwindled for want of subsistence.

The Noachian deluge did not continue long enough to form all the organic fossil matter found in the various strata. If fossil matter owes its origin to the general deluge, there would be a confused mixture of all animal relics, from man down to the most insignificant animal, but this is not the case; for when organic fossil matter imbedded in lime or gypsum is minutely examined, it is found to be of marine productions, such as shell and fish. Why there should be such a mass of fossil marine matter, and no relics of man and other animals that inhabit the earth, has never been explained. Marine productions have been discovered on the tops of lofty mountains. The fossil remains of the fox, the deer, the cow, the horse, and the mastodon, have been discovered at the height of sixteen thousand feet, on the Hymalaya mountains. Of the interior of the earth, we know nothing. M. J. A. Chaptal is of opinion that the central part, consists of the stone known by the name of granite: he infers that this is the case from excavations which the art of man and currents of water have made in its surface.

Granite he considers to be the nucleus of the globe, on which all matters of posterior formation rest.

The earth, when first formed, was in a state of chaos and probably contained a large portion of vegetable, animal and mineral matter, diffused among various other principles, all of which were blended with water. Heavy substances first found their way towards the centre of gravity, and excluded lighter bodies. In this order of things, water made its way upwards, filtering through grosser materials and ultimately found its way to the surface, which it completely covered. Heat then acted upon the surface and volatalized it; oxygen, nitrogen and other gases united and formed an atmosphere. Heavy substances having taken posession of the centre, lighter bodies must occupy higher regions, so that the most volatile matters are to be found floating on the upper surface of the atmosphere, and the earth more dense as we proceed towards the centre. But here a question naturally arises, why do we find ponderous rock and mineral matter on the earth's surface? Why have they not progressed and found their way to the centre? The reason appears obvious; they were small and detached in comparison to larger masses, and of course retained by the intervention of other matters. If then it be admitted that gravity brings down all bodies

to a central point, it would seem probable that our globe has a metallic nucleus wonderfully compacted and consolidated, having a pressure of posterior matter, three or four thousand miles in diameter. The envelopes of this great amalgam may be agate, jasper and diamond: their involution, ores, alloys, and primitive rock, and lastly, the various earths and salts, in which the vegetable and animal fossil matter is imbedded. From what has been said, all light bodies and detached portions of matter, are to be found on the surface of the earth, resting on a solid foundation and capable of being moved in various directions. This was perhaps the situation of the earth soon after its formation, or about the time chaos was reduced to order; but as soon as the earth received its rotatory impulse, many important changes on its surface took place. Her motion from west to east agitated the waters, and produced a great western current, which continued until it was retarded by gravity and friction, and obstructed by marine mountains and extraneous conglomerations. The effort of this current was, to bring together large portions of loose earth, which were elevated and consolidated in an eastern direction and formed the continent of Asia, 4740 miles from the Dardanelles on the west, to the eastern shore of Tartary, and 4380 miles from the southern part of Malacca, to the most northern part of Nova Zembla. Asia was probably a small continent when the All-wise Creator planted the garden of Eden, in which he placed Adam and Eve. Since that, large masses of loose sand and earth have been thrown upon its eastern coast, until the continent attained its full size. This current brought up at the same time, materials enough to form the Asiatic Isles, New Holland, and the American continent, which is nothing more than a continuation of Asia from Behring,s strait to the 56th degree of south latitude. These immense accessions of matter to the east of Asia, caused a reaction in the waters, and threw up large masses of matter in a contrary or western direction, which gave rise to the continents of Europe and Africa. As soon as these continents were thrown up and consolidated, they divided the waters, in such a manner that the great current was cut off, leaving the oceans to be influenced by the winds and tides. Many ages might have passed away before this current threw up matter enough to form the various islands and continents. Asia was, no doubt, large enough in the time of Adam to support his descendants for many centuries, and she now supports more than half the human race. If this theory be correct, there can be no longer any doubt as to the manner in which the various continents were first inhabited—they all join or approximate; and when mankind multiplied, they spread abroad and emigrated to new countries.

A western current, has been denied by some, and warmly supported by others. Nothing appears more probable than that such a current once existed. If a vessel filled with water be drawn along a horizontal plain, the fluid will be thrown in an opposite direction to the course of the vessel. Again, if a globe be dusted with fine starch and projected briskly through the atmosphere, the starch will form a cloud in an opposite direction to the course of the globe. Lastly, if a globe be moistened with fluid paste, and turned briskly to the east, there will be a western movement of the paste and it will be elevated and collected in large masses on the eastern surface of the globe. GALEN.

OBSERVATIONS ON RAILWAYS, WITH HINTS TO RAILWAY COMPANIES.

From the London Morning Chronicle.

Mr. Editor,—The art of forming railways and of enduing them, as means of transport, with the utmost degree of economy, velocity, and security, is yet in its infancy. To the promotion and construction of these works, or to the determination of their probable success, as durable fountains of profit, the thoughts and attention of engineers, of merchants, manufacturers, agriculturists, capitalists, indeed, of all the enterprising portion of the community, are as keenly directed as were the efforts of our immediate forefathers to the establishment of Canal Navigation.* The two most important enterprises of this nature now in activity—the Stockton and Darlington, and the Liverpool and Manchester railways—have been highly lucrative from their outset: a fact, in the history of mercantile associations of this nature, as remarkable as it is encouraging. In a commercial sense, the objects of these two railways are distinct; the one being limited, almost exclusively, to the transport of coal; the other combining the convenience of myriads of passengers, with the carriage of an infinite variety of merchandise. These two great, and hitherto successful, experiments may not be inaptly compared—as to their novelty, their purpose, their importance, and their results—to the two first specimens of artificial communication by water in this island, viz. the Sankey Navigation, and the Duke of Bridgwater's Canal. The comparison will hold good under each of these heads; and I confess that I am sanguine enough to think that the two iron ways will rival, in permanency of profit, the celebrated water-ways referred to; and further, that railways and canals may co-exist, with fair gain to their respective proprietors. But, it behooves the authors of new and similar projects to inquire diligently into the particular causes of the success of these first experiments; to compare carefully the springs whence these parent railways derive their traffic, with the sources relied upon as feeders to the projected lines; to investigate the most minute details of daily expense; to analyze rigidly the cause of wear and tear, as well as of all interruptions and accidents; in short, to make themselves as thoroughly masters of the subject, and to act with as much forethought and deliberation as an individual would do in a private venture. It is not upon the engineers that reliance should be placed for mercantile details or points of management; our business is simply that of workmen; it is upon mature and well-digested plans, aided by an *efficient direction*, that the prosperity of all associations of this nature must mainly depend.

Professionally uninterested in railways, I am impelled to submit the following hints and obser-

* The canalization of Great Britain has, in fact, been accomplished within the memory of man; for there still lives one of the original proprietors and chief promoters of the Sankey Canal Navigation—the first artificial waterway in this island. I mean Nicholas Ashton, Esq. of Woolton, near Liverpool, now at the advanced age of ninety years. This canalized brook conveys the coal from the pits about St. Helens to the Mersey, near Runcorn. A railway has recently been opened between the same points, which will probably, contend as successfully against its aqueous opponent, as does the Stockton and Darlington against the rivers and canals in its neighborhood.

vations to the attention of the public, and of railway proprietors, by an ardent desire to see railway conveyance rendered as secure as it is expeditious; and by the conviction that this great desideratum is not only practicable, but that its accomplishment is essential to the lasting profit of such undertakings. The promotion of the interests of humanity is the true aim and end of science; and Great Britain can furnish abundant examples to show that mankind appreciates so accurately the value of whatever contributes to its welfare, that the greatest honors and fortunes commonly crown the exertion of those who are most successful in perfecting inventions for the use of man. I feel, then, that no apology can be required for the public expression of sentiments on subjects so interesting to society, and to ourselves, as the prosperity of a great enterprise, and the preservation of our own existence.

The proprietors of a railway are as deeply concerned in insuring, to the utmost of their means, safety of life and limb to travellers, as in economising their own expenditure. These are matters of weighty import to the Liverpool and Manchester and to other established companies; but they are of still greater consequence to those recently created for uniting the metropolis, by similar means of transport, with the northern marts of commerce. The London and Birmingham, and the Grand Junction Railway Companies, cannot be too diligent in ascertaining the various causes of the casualties which have occurred in railroad conveyance; they cannot be too careful to avoid, *in the original plan of their railway*, any defects which may have had a share in occasioning accidents or hindrances on those already executed. The two enterprises referred to will require millions of capital for their completion; it is probable that the conveyance of passengers and goods will encounter, on these greater lengths of line multiplied difficulties and delays; and it is possible that yet undiscovered sources of personal danger may present themselves. Let it be borne in mind, too, that railways, once laid down, cannot be altered in their dimensions like a turnpike road; tunnels, bridges, viaducts, &c. cannot be widened or narrowed at pleasure; the errors of their first formation will remain nearly, or altogether irremediable.

It will, I doubt not, be granted, by persons conversant with the subject, that the distance, *four feet eight inches*, between the two lines of the Liverpool and Manchester railway, has been found in practice most *fatally* limited, as, also, the pathway on either side of the lines. These scanty spaces render the descent of travellers from a carriage, or the unloading of a luggage wagon, not only dangerous, but nearly impossible, should an axle break, or other of the not unfrequent occasions for stoppage arise whilst passing embankments, or deep perpendicular cuttings. It is unnecessary for me here to particularize the many other inconveniences resulting from this, I fear, incurable fault in that railway.

The running of engines or carriages off the rails is another frequent cause of delay to trains of merchandise, as well as of danger to passengers; and inexpressibly awful would be the consequences were a train of coaches (suddenly diverted towards the other line, by some impediment on the road, or some derangement of the machinery) to encounter an engine proceeding in the opposite direction. Such a crash might indeed be disastrous! And who will be bold enough to affirm that so melancholy an event may not reasonably be expected, sooner or later, to occur?

I am not disposed, sir, to imagine improbable, or barely possible catastrophes; nor do I desire to kindle, in the breasts of persons unaccustomed to travelling by railways, an apprehension that this mode of conveyance is attended with greater danger than the more usual ones. Such is not my opinion. On the contrary I believe that the records of travelling, either by land or by water, cannot supply data so satisfactory, on the score of safety to travellers, as those deducible from a comparison of the number of persons conveyed along the Liverpool and Manchester railway with the number of accidents which have happened to them. But I do think that precautions might be, and *ought* to be adopted, to check the recurrence of many accidents, particularly those most to be dreaded, arising from engines running off the rails. I am aware that this has been very partially effected (at the Sankey Viaduct, and at one or two other spots considered as particularly dangerous,) on the Liverpool and Manchester railway, by a very simple and not costly contrivance, first applied along a high embankment on the Bolton and Leigh railway. I allude to the introduction of a beam of wood, or continuous iron bar, placed parallel with and near to one of the rails on each line, of such height as to present a sufficient obstacle to the passage of wheels over it.

In laying down a new railway, it would be well for companies to consider, whether some such safeguard, extended throughout the line, should not form part of their original plan; whether twelve feet should not be allowed between the middle rails of a double railway; and six feet for the width of pathway on either side. An additional defence against the possibility of collision between approaching trains might also be advantageously provided by fixing a strong railing of moderate height along the middle of the roadway, and throughout the whole extent of the line. This railing would serve as a complete barrier to passengers crossing the road, to the imminent danger of their lives; and it might be so constructed as to form a support for a series of low lamps, which would, in every respect, be more suitable to railways than elevated ones! I cannot but think that had the width, above prescribed, existed between the two lines of the Liverpool and Manchester railway, even without the safeguards mentioned, we should not have had to deplore the loss of Mr. Huskisson, and that the fatal calamity of the 1st of February last would not have been so extensive. Neither these nor other similar catastrophes could have occurred, or can occur, were a breast-high railing established between the lines.

The half-yearly reports of the Liverpool and Manchester Railway Company are documents of inestimable value to all concerned in that or similar undertakings. The candid and just observations of the directors of that railway, in their last report, leave no room to doubt that they are impressed with a due sense of the numerous defects of the engines now employed by them, and that they are not only on the alert to discover, but also well disposed to adopt, such improvement as may tend to diminish the cost of working, or to increase the performance of these machines. I fully concur in their

remark, that "the locomotive engine is, beyond comparison, the most eligible, indeed the only efficient moving power for railways;" nor can I refuse to accord to those directors a full measure of praise for their sagacity in selecting this instrument as their motive force, in preference to horses or stationary engines, as well as for their fostering care of its infantine weakness. I am aware that an Edinburgh Reviewer, and other self-sufficient (perhaps, self-interested!) critics, have thought that, by ordering engines from every aspirant to locomotive glory, the directors would have achieved still brighter conquests. I am not the panegyrist of the Liverpool directors, but this opinion is groundless; and I do think that the learned reviewer would act more creditably and usefully by confining himself to his compilations and cheap knowledge books, than by giving public and anonymous vent to petty tales and slanders on the conduct and performances of men, whose practical science and labors have accomplished more in two years, for the benefit of their country, than all the scribblers and all the reviewers will accomplish in two centuries.

The locomotive engine is a combination of the ideas and contrivances of many heads. That it should, with all its imperfections, have been brought to its present state of usefulness in so short a time, is highly creditable to the ingenuity and exertions of the Messrs. Stephenson, and of the other contributors to its actual mechanical form and powers. I know, however, that various very admirable schemes for increasing the power and durability of the boiler, as well as for improving the general arrangement and application of the engines, are contemplated by different contractors. But it is vain to expect that inventions, which may be termed rather skilful dispositions of parts than new discoveries, should see the light, when it is considered how heavy is the expense incurred by the engine builder in experimenting on so costly an apparatus, how uncertain is his success, and how immediate would be the adoption of his improvements by his rivals in trade. Nor can any reasonable man urge the directors of a railway to speculate in inventions; but they may hasten their developement, and appropriate them to their service; they may, through timely encouragement, anticipate, by many years, the fruits of mechanical skill, and brighten the prospects of their own and similar enterprises.

The directors of the Liverpool and Manchester railway will, I trust, pardon me for suggesting to their consideration a measure which might possibly accelerate the march of improvement, and, at the same time, diminish, in no slight degree, the amount of that weighty item in their disbursements, "*Locomotive Power.*" I advise them to repeat the trial of what they themselves have correctly styled a "happy expedient;" I mean that they should renew the offer of a reward for that engine which shall unite, in the most eminent degree the now well-ascertained requisites to its perfection. Let the prize contended for be worthy the acceptance of engine-makers; let it be such as, to induce them to risk a failure in the strife; and such as, in the event of success, will constitute, an ample remuneration for their skill and labor. I feel confident that the offer of one thousand guineas reward to the victorious candidate in such a contest, would be attended with results not less beneficial to railways at the present era, than were those which came out of the first famous mechanical combat.

It appears that the working and repairs of the locomotive engines, on the Liverpool and Manchester railway, cost, annually, about £24,000, or, in other words, *the startling sum of* £800 *per mile, per annum*, on the length of their line. Two-thirds of this amount are comprised under the sole head of repairs; to which outgoings should be added the interest upon, and depreciation of, a large stock of tools and materials, composing the workshops and hospitals; the latter of which are commonly filled to overflowing with sick or disabled locomotives. Surely, then, one thousand, or even two thousand guineas, might be well applied in the endeavor to diminish so large a draught from the profits of the company, for wear and tear is an absolute and irrecoverable loss.

I will now proceed to trace the outline of the broad principles on which such a trial of skill should be conducted; a trial which would bring competitors to the goal, the productions of whose efforts would far more than compensate the company for the value of the stake.

I assume, as postulates, that the average weight of the best engines now on the railway is sufficiently great, and that two eleven-inch cylinders, working under a pressure of steam of fifty pounds per square inch, are found to possess sufficient power. I then suggest, as bases, the following conditions:

1. That the maximum weight of the competing engines shall not exceed that of the best engine in the company's employ.

2. That the maximum pressure of the steam shall be fixed, and shall be alike in all the engines; and that the calculated power shall be equal to that of two eleven-inch cylinders, with an eighteen inch stroke, working under a pressure of steam of 50 lbs. per square inch.*

3. That all the competing engines shall commence working on a given day: their duty to be that of making complete trips, during a given period, between Liverpool and Manchester reciprocally, with trains of merchandise of a determinate and ascertained weight.

4. That in the event of *equality of performance* between any of the competing engines or between them and any of those in the company's employ, their *relative* powers and properties shall be decided by subjecting them to a proof of their *absolute* powers and properties; and that this shall be the conclusive trial.

5. That one thousand guineas shall be awarded to the constructor of that engine which shall have proved itself superior both to all its competitors, and to any engine in the company's use: that the company shall purchase such engine for the sum of one thousand guineas, and order from its maker the next five engines which they may require.

6. That five hundred guineas shall be awarded to the maker of the second best engine, provided it

* That the greatest latitude of construction may be given to engine-makers, the dimensions of the cylinders should not be prescribed, merely the calculated power resulting from the bulk of steam consumed by the number of strokes of the pistons per minute. This is requisite in order to insure a fair trial, as all the engines, whatever may be their construction, should be on precisely equal terms as to their *nominal* power; otherwise a proof of their *absolute* power would not be conclusive in regard to their *relative* merits.

be adjudged to possess advantages over the company's engines; and that the company shall purchase such engines at a fair valuation.

Every facility should be given to the candidates, previous to the trial, to prove their engines on the line, either with or without loads, subject to the convenience and rules of the company. Twelve months should elapse between the publication of the challenge and conditions, and the day on which the competitors shall enter the lists.

I have recommended the Liverpool and Manchester company the more especially to institute this trial, as their railway is in full operation, and consequently they would the sooner reap the advantages of those results, which cannot but prove important to them. But the scheme applies with equal force to all railways, and, were a combat of this nature to take place on the opening of a new line, and *periodically* on different lines, the whole engineering talent of the country would feel its stimulus, and be pressed into the service of railways.

In furtherance of this design—viz. that of exciting the mechanical world to the improvement of locomotive engines, and of railway conveyance generally—too great publicity cannot be given to all facts tending to illustrate the excellencies and defects of the existing system. A register should be kept and periodically published of the duty done by the engines. In one table might be presented a list of the engines in the employ of a company; the makers' names; the date of their use; the construction of the boiler; specifying whether with or without tubes; the diameter of the cylinders, and length of stroke; whether placed horizontally, vertically, or inclined; whether working on a cranked axle or otherwise; whether actuating two, or all four wheels, and their size, &c.; the pressure of the steam, the kind and weight of fuel burnt; the nature and amount of work done; the injuries sustained, and from what causes; the number of hours actually worked in a week, &c. &c. Such are the data which ought to be collected and analyzed by the judicious engineer before he decides on his plans and executes an engine; but these facts are obtained with difficulty. It is, indeed, impracticable for any other than the mechanic residing contiguous to a railway, to acquire that precise information on the respective merits of the various form of locomotive engines in actual use, which can alone instruct him how to remedy the defects, and by what means to diminish the wear and tear of these costly machines.

A concise summary of the principal properties of a variety of engines, accompanied by a notice of their performance, of the casualties to which they have been subjected, of the parts which have needed repair or been renewed, arranged in a tabular form, and published *monthly*, would give to the engineer, at one glance, more exact and valuable knowledge than could be acquired by him were he to pass his whole time on a railway. It would stimulate the engine-men to be cleanly and diligent, as their reputation would be thus indentified with that of their engines. They would become more observant of incipient imperfections, such as leakages, the loosening of bolts, the want of oil to the wearing parts, the waste of water in the boilers, the stoppage of the pumps, &c. &c. and they would be more sedulous in preventing gross repairs, by timely precautions, were their too-often culpable negligence made notorious.

Of the efficacy of publicity in promoting a rapid advance towards perfection in the use of steam power, we have a case in point, from the effects produced by the printed monthly reports of the duty done by the pumping-engines in Cornwall. An inspection of the summary table for a series of years, given in Mr. John Taylor's "Records of Mining," will convince the most skeptical of the advantages which have accrued to the miner from this system. He will there learn that a bushel of coals, which, a few years since, raised only *seventeen* millions of pounds weight of water one foot in height, is now made to raise *eighty* millions of pounds to the same height. This immense increase in the effective performance of the pumping-engine is chiefly attributed to the publicity given to the construction of various engines, and to the modes of applying their power. The same instrument, the *press*, is now working a similar miracle, in the mining districts of North Wales; and it may be rendered equally as effectual an agent in accelerating the perfection of locomotive engines and of railway conveyance.

Facts of a still more interesting nature to the public might also be periodically communicated, not only without detriment to the proprietors of railways, but to their manifest advantage. I refer to the accidents occurring, from time to time, to those employed or travelling on these roads. In the want of an authentic record of such casualties, (excepting in the event of loss of life,) any ill-informed gossip, or penny-a-line man, becomes the bearer of his version of "*a dreadful accident on the railway*" to a newspaper editor, which goes the round of the journals, and "frights the isle from its propriety." Be such tale true or false, correct or exaggerated, the reputation of the railway equally suffers. An antidote should be instantly applied, and this antidote would be found in a simple unvarnished statement of the case emanating from the directors, and published by their authority. I could quote numerous instances illustrative of the truth of these remarks, and an acquainted with many persons whose natural timidity has been so excited by such garbled reports of accidents, as to deter them from venturing on a railway. But were a full and explicit statement published of every occurrence of this nature worthy of note, accompanied by a proper explanation of its origin, the public would not be unduly alarmed, precautions would be enforced, and means would frequently be devised for removing some of those imperfections which still disfigure railway conveyance; imperfections arising often from original bad construction, often from mismanagement, and which are the cause (though happily rare) of disasters to passengers.

In the persuasion that you, sir, are ever ready to lend your columns for the advancement of knowledge and the arts, I do not hesitate to request your insertion of these hints and observations, should you deem them suited to their object, and likely to promote the perfection of a system of travelling, of which the town of Birmingham is about to become a centre.

I am, sir,

Your obedient servant,

A CIVIL ENGINEER.

MARL BEDS IN NEW KENT—REMARKS AND QUERIES ON FARM MANAGEMENT.

To the Editor of the Farmers' Register.

New Kent December 14th, 1833.

A few days ago, the "Farmers' Register," Vol. 1st; No. 7th, fell into my hands, being the first No. I had ever seen: although the publication itself is highly spoken of, by the best practical farmers in this and the adjoining counties, yet, the Register is not so widely diffused as (I believe,) it ought to be. It should be in every man's house, there to be read and studied, and such improvements as are therein recommended, should be put in immediate practice.

I very much regreat, that when you were in James City county, at Mr. Archer Hankins', you did not come into New Kent, before you returned home. New Kent abounds in what is generally termed *marl*, and your very presence on that score alone, would have roused numbers of us from that supine, lethargic state, into which we have unhappily fallen in regard to the improvement of our farms. Man is an imitative animal; and because father and grandfather never raised manure of any sort—never used any other plough except a *trowel-hoe* passing through a pole like a cart tongue—the son, nor the son's son will not do otherwise. It is recorded, that a certain race of men, formerly, made their beasts of burden draw by their tails; and it required the force of the bayonet to make them alter their mode of gearing, &c. so strong is education.

The different marls beds that I have examined are mostly exceedingly rich. The one owned by Mr. A. W. Hockaday, is imbedded in a red sand, with some red clay between that and the marl. The shells are all entire, and of one kind only, *the clam shell*: the very same species of animal that may be now taken in a bundance at York Town. The bed owned by Mr. A. Mitchell is, in my opinion, by far the richer of the two, and is composed of shell, chiefly of cockle shells, with here and there an oyster shell. In this bank about four feet from the surface, I discovered a rib-bone, petrified, that must have belonged to some enormous animal; the kind can now no where be seen. It must have belonged to the mammoth, if the Indians are right in their notions of the existence of such an animal formerly. This rib was six feet long, nearly three inches broad, and two thick, and this appeared to be but a part of what it was originally. Mr. Mitchell's marl is surrounded, (except at the bottom,) by a red, dark, soapy clay: in the centre of the marl may be seen a stratum of marl so calcined, or so pulverized, as to resemble cheese in the cutting; and at what I term the bottom of the marl, is a stratum greatly resembling ready made mortar for plastering, except that it is not so wet. Under this is a stratum of marl petrified, from one to four inches in thickness, rough and uneven. This last we throw aside as useless; although if burnt, I believe it would make good rock lime. The best marl I have ever seen, is owned by Mr. Archer Williams of this county; and I speak advisedly, when I say, that he owns a sufficient quantity to cover every foot of level cleared land in New Kent, one half inch in depth. If analyzed, I believe there would be found ninety parts of pure lime to the one hundred, with, perhaps, some magnesia. To the credit of Mr. W., I speak it, that he freely gives to all persons what they may choose to haul away.

One insuperable barrier, there is, however, to improvement in Virginia: one that I fear, will remain till "tongues shall cease, and knowledge shall vanish away"—to be plain, I mean slavery. It has tainted our morals, manners and lauguage—corrupted us in a thousand ways, and yet we cling to the accursed thing, and hold it *dearer than life itself!* Slaves are not intrinsically worth more than half what they were some twenty years ago. They are by far less governable, tractable and obedient—will do only what they choose, and when they choose. They are daily more insolent, thievish and lazy, and if punished, they may abscond, and be protected in Philadelphia or New York—or possibly remain to do worse.

I verily believe, not one farmer in ten, clears one per cent. on the cost and charges of his slaves. The owners barely can breathe, and not unfrequently ore compelled to sell one or more every year to aquare their accounts. But like the Jew of Bristol, who lost seven teeth by order of the King of England, and was to lose one per day, till he paid or advanced the needy king 10,000 marks, these same men had much rather sell their teeth, than their slaves. Unhappy, inglorious state of things.

I pray you, sir, recommend in strong terms, that an agricultural society be formed in every county of the state. New York is seventy-five years a head of us in agriculture. The Flemings one hundred and fifty years. The British one hundred. New York has an agricultural society in every county, and the great benefits arising therefrom are seen and felt to an astonishing degree.

Our lands for the most part are sandy, and any information in regard to the improvement of this kind of soil, will be of great benefit to most persons from the head of tide water to the Atlantic?

Query.—If we were to sow oats, and roll them when ripe, and marl on them, would it not be a more speedy and cheaper way of improving than hauling leaves, &c. from the woods?

Query.—Is there no grass that we could profitably sow, to take the place of hog weeds and carrot weeds, with which our fields, that lie fallow, abound?

Query.—How is wire grass to be destroyed?

Query.—If every citizen were compelled by law to keep his own stock, on his own farm, and not permit them to roam at pleasure on every man's land, for a scanty subsistence, would it not be better for one and all? Would it not be a great saving of timber for ship building, house building, &c. a great saving of labor and time, (it requires three years in every ten,) in making dead fences?

If these desultory remarks are worthy of your attention it is well—otherwise it is well. If they appear in the Register for January, perhaps some of your correspondents may furnish some information to satisfy the querist.

Yours, with respect, W. X. Z.

TRANSPORTATION AND SALE OF MARL FROM MIDDLESEX.

To the Editor of the Farmers' Register.

Your work on calcareous manures, has already given a new direction to public inquiry, in the tide-water section of Virginia. In many parts of the

country, we see large deposites of marl, ready to be scattered on the soil, where a short time ago it was not known to exist, and it is now a very general inquiry, have you marl on your land? In the county of Middlesex, where agriculture has for a long time been at a low ebb, but is now rapidly improving, the most abundant supplies of marl are to be found, most conveniently located, and of excellent quality; and many of the citizens are now using it extensively, as the certain means of improving the soil. One gentleman, Mr. Wm. Jessie, marls annually an hundred acres, and is rapidly resuscitating an impoverished and worn out farm. And to show you the estimation in which marl is held, I will mention the case of Mr. Dormer Oaks, who lately purchased several hundred acres of poor land in Middlesex, for the value of its marl alone. He is shipping it to Maryland, where he meets with a ready sale under contract. Returning from Baltimore a few weeks since, he informed me that he had just received several hundred dollars from one gentleman for marl, at twelve cents per bushel. Mr. Oaks' marl contains about eighty parts in the hundred of carbonate of lime, is about a mile and half from the water, and inexhaustible in quantity. He thinks, with the facilities of a railway, it would become a most profitable article of commerce, and talks of applying to the legislature for an act of incorporation. Should he succeed, he contemplates making a railway from his marl pits to the river. It is to be hoped, that this gentleman's enterprise and industry, will be amply rewarded; and that the legislature will be as ready to incorporate a company to dig for marl, as for coal or gold. If bones can be carried from the field of Waterloo to England, to be ground for manure, and plaster of Paris be brought to the United States from France, for the same purpose, why may not marl also become a valuable article of commerce?

Respectfully yours, WM. H. ROY.

Green Plains, December 27th, 1833.

CHEAT FROM WHEAT.

[The following memorandum was found among the papers of the late Richard K. Meade of Brunswick, who was "an experienced farmer, and a close observer of every thing relative to agriculture." The memorandum is extracted from a rough draft (in the hand writing of Mr. M.,) of a letter intended for publication, but which probably was prevented by his death. Our opinion on this much contested point has already been stated to be against the transmutation doctrine: nevertheless, the opinions of others, whether adverse or conforming to our own, and on every other subject as well as this, will be received with equal favor in the Farmers' Register.]

—— Cheat or chess I believe to be degenerated wheat—for this reason, among many others. Many years ago, when I had never discovered any cheat in my crops of wheat, a parcel of sheaves of wheat when hauling from the field, fell from the cart into an old ditch, the bottom and sides of which were rich, and well set with grass and weeds. Of course, after taking up the sheaves, an abundance of shattered grains were left, which vegetated, and were not disturbed by fowls, or stock of any kind, which I had a fair opportunity of observing throughout all its growth, as I passed by the place every day, and often several times in a day. I recollect to have examined, and saw the grains of wheat sprouted, and rising as thick as they could stand. The following summer, there was an abundance of cheat, and *not one head* of wheat.

THE POLICY OF VIRGINIA IN REGARD TO RIVAL PUBLIC WORKS, AND PARTICULARLY THE RAIL-ROADS FROM THE ROANOKE.

To the Editor of the Farmers' Register.

Moor's Mount, Caroline County, December 18th, 1833.

In transmitting to you my year's subscription, (which would not have been so long delayed, but for a misapprehension) I conclude to accompany the apology and cash, with some reflections occasioned by Mr. Jas. C. Bruce's communication on horizontal trenching, and your's upon the management of the corn crop. But before I enter upon them, I feel it to be but justice, in making this first communication to express my entire satisfaction of the high character your most useful Register has attained, and the flattering prospect of an extension of its circulation, which promises its continuance with some remuneration for your patriotic exertions in the cause of improvement. I assure you, I shall not abate in my zeal to increase your subscription list, as I am persuaded, every farmer who can read, would find it to his interest to take the work; and therefore, I hold it to be an act of benevolence to urge my neighbors to subscribe. Yet I am sorry to find that as yet, but few can be brought to innovate upon their old routine of Bible and newspaper reading, which is the extent of most Virginia farmer's studies, who read at all; while the non-reading majority are of course utterly dead to any influence in favor of your work.

I am aware that these remarks must be regarded as any thing rather than complimentory to my native state, sometimes, rather boastingly I fear, designated by us, as the "ancient and renowned commonwealth"—a severe criticism upon the literary character of that most useful class of her citizens, which in all countries comprises the bone and sinew of a nation, if not the *elite* of its intelligence. But believing them to be just, my *amor patriæ* will not suffer me to blink an expression of them upon any appropriate occasion. I think, however, that we could hardly have a right to expect a different result, from our miserable system, or rather want of any system of public education.

I find myself digressing into reflections upon a most prolific subject, and losing sight of that upon which I designed a passing notice at this time, and which is rather more appropriate for your Register.

Your correspondent from Halifax, incidentally adverting to improved facilities for transporting the products of the Roanoke country to market, fondly anticipates a great increase when the Portsmouth rail-road to Weldon shall be finished; inferring that with the two rail-roads, his country will become more a wheat than tobacco growing country.

Now I am inclined to think, that your correspondent (in whose judgment I have great confidence, if free from bias,) has without due consideration adopted the conclusion, that the trade of the Roanoke valley, and adjacent country even, with the southern travel, and a good portion of the trade of some neighboring counties of North Caro-

lina, will be sufficient to sustain two rail-roads, without inflicting tolls which will make the facilities too dear to be comfortable. He, perhaps, has not reflected that the Petersburg rail-road, of wooden construction, has cost nearly half a million, and that in six years, it will require the additional expense of over $100,000 more, to replace the wood, which will decay in that period; and that in the interim, a considerable annual charge for temporary repairs will be unavoidable. That a capital of at least six hundred thousand dollars must be regarded as what at least eight per cent. should be annually declared upon, to keep the stock at par, and yield five per cent. net, to the stockholders.

If the above conclusions are just, I would ask what must be the result if a rival rail-road go into operation, to take off, we will say, one half of the support of the present road? It requires no adept in Cocker to see at once, that the stock of neither would be worth one cent, and the only hope for the continuance of either, would rest upon the exertions of the property-holding subscribers of Petersburg, and her rivals of Norfolk and Portsmouth. This would probably not be a vain hope, were the works made of ever-enduring granite and iron, instead of frail decaying wood. The stock might be utterly worthless, and these towns might afford to incur the expense of keeping such rail-roads in operation; but with wood construction, as that of Petersburg and its proposed rival, when once worn out or decayed, will any reflecting man say that the heavy expense would be encountered, or that the farmers and planters of the Roanoke would come to the rescue? I am disposed to think, as much as the Roanoke people prize the facilities afforded them by these rail-roads, that in such an emergency, they would be more apt to furnish *words* of encouragement, than *dollars* for assistance. Apropos, to test these conclusions: I would be gratified (and so will others I expect,) if your intelligent and candid correspondent would through your columus, inform the publick, how much of the Portsmouth rail-road stock, is taken, by inhabitants of the Roanoke country: with a slight modification of the scripture text, I would say unto them "show me thy works, and by them shall thy faith be judged of," in relation to the profit to be derived from investment of capital in of this stock. Indeed, I am curious to know, whether the three fifths of this stock, subscribed with the hope of getting two-fifths from the state, were not taken exclusively by property-holders in Norfolk and Portsmouth, and along the proposed route, and who would have their property benefited to the amount of their subscriptions, whether the stock ever netted one cent's dividend or not. If it should turn out to be a fact, that there is no capitalist from a distance embarked in this enterprise, I ask whether it is not the best criterion to judge by, whether there is any expectation that the stock will yield a dividend: and if so, should the state be guilty of the fatuity of taxing itself $160,000, to insure the destruction of a like amount invested in the Petersburg rail-road, (that would in all probability yield six per cent. returns, to aid other much needed and promising works in other neglected parts of the state,) to benefit Portsmouth and Norfolk, at the expense of Petersburg and the stockholders in her rail-road, when these towns have heretofore received a large sum from the state to aid in opening their canal, which communicates with this same river?

The Petersburg rail-road was, in its projection, without the anticipation of a rival, regarded as promising a profitable investment; and distant capitalists, I am credibly informed, subscribed to the amount of near a fourth of the three-fifths taken by individuals. This foreign capital was allured into Virginia in aid of her poverty, for the construction of this great state improvement, upon the confidence inspired by the large participation of the state in the work, as I am informed by the distinguished engineer that surveyed the route, whose zeal in behalf of his native state's prosperity and character, induced him to exert himself to effect this most desirable assistance from abroad. These capitalists doubtless regarded the faith of the state as secured by its great interest in the work, against any participation in creating a rival that will operate no other way, than to rob this on which their money has been expended, of that support, from which alone that return in profits was expected which was the sole consideration which induced their subscription. If the property-holders of Norfolk and Portsmouth have the spirit and enterprise to construct a rival road to draw more of the trade of this region to them, than finds its way by the circuitous water communication, none dare hinder, and none can complain. But it does seem to me, that if the state allure them to do it, by taking two-fifths of the stock, it will be regarded by capitalists as a breach of faith: especially if done before the Petersburg rail-road has had time to test the enterprise, and show that its stock is beyond contingency. The effect must be, to blast every prospect of any capital, other than that held by property-holders on the route of the improvement ever being adventured on any stock for internal improvement in Virginia.

Men are rarely found so stupid as to lay out their money in stocks which promise neither dividends nor any enhancement in the value of their property. Indeed we see them generally too cautious in venturing their money on stock, in works that must inevitably enhance their property in value, if it be any ways doubtful, as to a good dividend. The case must be as palpable as this of a rail-road from Weldon to Portsmouth and Norfolk is, to the property-holders of these cities—presenting a conflict for securing a large trade, the profits of which would counterbalance the loss of threee-fifths the cost of the work.

Ardently desiring the prosperity and glory of my native state, and advocating an impartial apportionment of government assistance, I can but deprecate the encouragement of a deadly rival of the Petersburg rail-road, by any assistance from the state at this time, or in time to come, while the inevitable result must be to destroy the stock in that work, and a warning to capitalists to beware venturing their money in internal improvement stock in Virginia.

I had confidently hoped to see a joint-stock company, and the three-fifths of the stock promptly taken by individuals, for continuing the line of rail-road on from Petersburg, to meet the Washington steamboats on the Potomac near Fredericksburg. But if the state take two-fifths in the Portsmouth road, by which the southern travel will certainly be divided, I despair of one dollar being subscribed by northern capitalists, who otherwise, I am assured, will embark largely in the enterprise. This

assertion is not made on mere speculation, but from unquestionable sources of information.

In conclusion upon this subject, I must remark, that I cannot conceive any one capable of taking an expanded view of the improvement of the state, at all cognizant of the deficiency of capital with us, but that he must see the importance of legislating upon the subject, with a special regard to the encouragement of distant capitalists to participate with our citizens in making improvements, instead of blindly persevering in a course calculated to depress existing stocks by promoting rival works. We have unfortunately legislated upon this last principle already, to an extent, which makes it difficult to obtain subscriptions to the James river and Kanhawa connexion, that but for apprehensions of rival works being patronized by the state as soon as this should be finished, would be regarded, and justly too, as the most promising stock in the union, (the Erie canal in New York always excepted)—a reflection will naturally spring up in the minds of capitalists, wishing to invest in corporate stocks, that if Virginia spends two-fifths to create a rival work to the Petersburg rail-road, in which she holds two-fifths of the stocks that is thereby sunk as capital, where is the guarantee that she will not take two-fifths to open a rival work to the James river improvement, down the valley of the Roanoke, which her late engineer reported quite as favorably upon as the James river. This is the real incubus that weighs down the James river enterprise; and Mr. Jos. Cabell will not be able to shake it off, I can assure him, unless his untiring energy can arrest the baleful legislation I have been complaining of, and which I so much deprecate, in reference to the Portsmouth rail-road.

I trust I shall not be regarded as inimical to the prosperity of either Portsmouth or Norfolk—far from it. I wish every portion of the state could be gratified in its wants. So did the dog in the fable want two pecies of meat as he swam the river with one in his mouth, and mistook the shadow of it in the water for another piece, snapped at it, and lost that which he had. I wish this fable could oftener occur to the minds of our legislators—I should not then feel so much apprehension, that we shall in despite of Pennsylvania's example to deter us, adopt her course and plunge the state millions in dept to make internal improvements, that will for generations to come, be so unproductive as to compel a resort to high taxes, to pay the interest on the loans, as is now the case with that state. Her grovernor, in his late message, reports that the gross tolls from the public works, that have cost the state about fifteen millions of dollars, amounted for the year ending 31st Oct. last, to $150,000 only: a sum, I apprehend, not more than adequate to defray charges of superintendence and repairs. So that near a million has to be raised by direct taxes, to pay the interest on the loans.

I feel well assured Mr. Editor, that your Halifax correspondent, now on the assembly, is the last man in the state who would desire to see Virginia in the condition of her sister Pennsylvania, or aid in leading her to the adoption of her system. Yet I doubt very much whether he could more effectually promote such a result than by voting assistance to the Portsmouth rail-road.

Dropping this interesting subject, with these hasty and cursory remarks, with a hope that they will at least serve to elicit reflection and discussion from abler heads and pens than mine, I shall draw to a close of this I fear already too tedious letter, with some brief notice of the principal subject of Mr. Bruce's communication and its kindred observations contained in yours upon managing the corn crop.

Having a broken farm to cultivate, which in the hands of my predecessors, had been much gullied and denuded by the old system of ploughing and cultivating up hill and down, I have tried several modes to arrest the evil and restore the land. For several years past, I have pursued horizontal bedding for corn, leaving a bed unploughed for every sixty or eighty feet on the hill sides and slopes, which I am happy to find effectual. The heaviest rains and thaws, even such as fell last night on ten inches of snow, that has caused a mammoth freshet here, do not break over these guards, so as to make gullies, and of course, if that is the case, the soil is not swept off broad-cast, as frequently is the case with such rains and thaws, where there is an even surface.

I have never tried the horizontal trenching recommended by Mr. Bruce, as an effectual guard against washing, except on a very limited scale. I think it much more laborious than my plan, and not as effectual. If the bottom of the trenches are of a loose friable soil, or sandy, a gully will be cut by a heavy water fall—whereas, by accurate horizontal bedding and the turf bed guard, this will rarely be the case. The bed left unbroken is by no means lost, as it serves to stack the crop upon, both corn and wheat, and should be shifted every other breaking up, for corn.

I approve of the trenching course for springy hill sides, or slopes, that must have more water to pass, than a secret ditch could at all times discharge—when that is not the case, secret drains are preferable—especially for all short spaces and oozy slopes, and spring heads near branches, which commonly have open ditches. It is a subject worthy of criticism, that our farmers are not more negligent in any thing tending to improve, than that of secret draining to relieve their richest land from water, that renders them rather a nuisance, than a source of profit. Experience will teach them, that the labor of making, (which will, I think, last many years,) will not be greater than twice cleaning away the briers and shrubs from the two sides, and cleaning out open ditches, which fill up nearly every year; and then there is the saving of land, and loss of time in turning twice every furrow in ploughing.

It had been my purpose to have offered some remarks upon the mode of planting and cultivating the corn crop, which I would recommend; but this letter has run out so much longer than I expected when I commenced, I must defer it until a more convenient season.

In the meantime, accept my best wishes for the continued prosperity of your useful work.

Respectfully, &c. JNO. DICKINSON.

NEW MINERAL MANURES PROPOSED, AS SUBSTITUTES FOR THE CELEBRATED "CENDRES DE MER," OR DUTCH ASHES.

In our remarks introductory to Sinclair's account of the wonderful effects of Dutch ashes as a manure, (No. 6, p. 375,) we alluded to the memoir of Mr. Hollert

which proposes an artificial substitute for them. A translation of the memoir which appeared in the last No. of the *Journal d'Agriculture, &c. des Pays-Bas*, has since been prepared by a friend, for the Farmers' Register, and which we now offer to our readers; together with two letters explanatory of certain terms therein used.

The Duch ashes and their effects have been particularly described in the article referred to above, and also in previous selections for the Farmers' Register. One of these passages will be quoted from the article on the *Agriculture of the Netherlands* (No. 2, p. 104,) to show the strength and value of this manure. "On these '[the fields in clover,] it is usual to spread, in 'March, turf-ashes brought in boats from Holland. 'From eighty to one hundred tubs, of about sixty 'pounds weight each, are employed for a *bunder*, 'one-third of which is kept to be spread after the first 'cut. Many of the Flemish farmers make great use 'of these ashes, which being highly impregnated with 'salts, enrich the land so as to render it capable of pro-'ducing excellent crops of wheat, without any other 'manure, except turning under the clover it was sown 'with the preceding year." The bunder is about three acres; so that these very great effects are produced by from twenty-six to thirty-three tubs of ashes to the acre. The practice of using these ashes in Belgium (as stated by Mr. Hollert) commenced in 1731, and as the dressings are frequently renewed, it may be inferred that the soils generally, have in 100 years become greatly altered by the chemical ingredients of the manure, and that its influence is considerable on the great agricultural product of that country. We learn from Sinclair's statement of the analysis of Dutch ashes, that they were found to contain

"Silicious earth,	32
Sulphate of lime [gypsum,]	12
Sulphate of soda, and muriate of soda [common salt,]	6
Carbonate of lime, [calcareous earth,]	40
Oxide of iron,	3
	93
Impurities and loss,	7
	100"

The silicious earth, or pure sand, which forms 32-100ths of the whole, should be deducted as worthless, in an estimate of value. Much the greater part of the remaining and active ingredients consist of calcareous earth and gypsum, and the balance of soluble salts and iron. There cannot be much doubt as to the accuracy of the analysis of a manure so valuable and so well known, and therefore there is not so much difficulty as might be at first supposed, in compounding an artificial manure of similar ingredients, and in the same proportions. The only important obstacle would be the expense. We may suppose however, that the chemical composition of the turf-ashes of Holland, is so well known by his scientific countrymen, that Mr. Hollert has been compelled to furnish similar ingredients to his artificial compound: and this belief will serve to allay the suspicions which are naturally produced by the circumstances of his having taken out a *patent right* to secure to him the benefit of his discovery, and his asking for a *protecting duty* on the ashes from Holland, as requisite to carry into effect his "patiotic" intentions and wishes.

When the memoir of Mr. Hollert first attracted our observation, the subject was considered merely as a matter of curiosity, and not likely to be of any practical use in Virginia. But though there is no probability of different results, it is possible that its publication may lead to investigation, and to practical good, in the preparation and use of new manures, resembling more or less the ashes of Holland. All the materials are furnished, or substitutes can be obtained in some parts of Virginia—and most easily in a region particularly needing the application of earthy manures. The coal mines of Virginia, offer an immense supply of a kind of coal which is of so little value for sale as to be a nuisance to the colliers—and if this is not the "*houille*" and "*terre houille*" used by Mr. Hollert, it may serve as a substitue for both. The marls recently discovered in the same region may perhaps supply all the balance of bulky ingredients needed for the compound.*

It is possible also, that materials might be found in our salt marshes to furnish the proper *turf-ashes* like those of Holland, which are so valuble that Sir John Sinclair urged their being shipped to England, for manure for clover. There is no true peat in Virginia, (unless it may be found in the colder and moister mountain region,) but our fresh water marsh earth will burn like peat, and so we suppose will the earth of the salt marshes.

The letters which will follow the translation are answers to requests for explanations of certain terms, either technical or provincial, which could not be otherwise obtained, and for which we are indepted to correspondents who have already contributed to the value and reputation of the Farmers' Register.

MEMOIR ON A NEW MANURE.

Addressed to the Members of the Committees of Agriculture, Manufactures and Commerce of the provinces of Belgium: by M. J. Hollert of Nil St. Vincent, (Southern Brabant.)

Translated for the Farmers' Register, from the *Journal d'Agriculture des Pays-Bas.*

Having received a patent for the invention of a mineral manure, the fertilizing qualities of which are analogous to those of the peat ashes of Holland, and whose effects are of greater duration, I should think myself, gentlemen, deficient in patriotism, if in the present circumstances, I mean at the moment of the separation of Belgium and Holland, I did not submit to you my reflections on the advantages which would result to the state and to agriculture, from the use of this manure throughout the whole extent of Belgium, if it should please the government to establish a light impost on the importation of the peat ashes of Holland.†

This proposition, gentlemen, premature as it may appear to you, is not therefore the less worthy

* Since the preceding article was written, Dr. Morton's letter was received (and published in No. 8,) giving an account of the recently discovered coal in Prince Edward county. His description of the "dead coal" which forms so large a proportion of the whole body, seems to agree very exactly with that of the "*houille*" of Belgium. See page 506, No. 8.—*Ed.*

† Or *Dutch ashes*, the value and effects of which are described at large, Farmars' Register, No. 6, p. 376.

of your consideration, and deserves a notice in the reports which you will address to the government in favor of commerce and agriculture; and it is in this hope, that I have the honor of laying it before you.

Before developing this proposition, I think it indispensable, inasmuch as the effects of this manure are little known, to give you not only an idea of its fertilizing qualities, but also a description of all the substances of which it is composed, in order that those among you, who by their agricultural knowledge, are capable of appreciating the great advantages which, if its use should become general, agriculture will derive from the employment of this substance, acting at once as a manure and improver of the construction of the soil, [amendement,] advantages which ought to merit for it the preference over the ashes of Holland, a foreign production.

If I had devoted myself to the investigation of this manure principally with the view of deriving private emolument from it, I should in rendering my process public, be guilty of an indiscretion which might profit those who would take advantage of it without my knowledge; but the only desire which animates me, is to see agriculture promptly reap the advantages of my discovery.

Since obtaining my patent, I have not ceased in prosecuting my researches, to bestow my attention on the means of perfecting this manure, and that object, I think, has been attained.

As I announced in a letter addressed to the agriculturists of the provinces of Liege, Namur, and Hainault, in the *Journal d' Agriculture des Pays-Bas*, for April last, this manure has for its base a salt similar to that which the ashes of Holland contain, or rather the same, and for recipient, substances known to be valuable as permanent improvers of soils.

These substances are; calcareous rock reduced to powder, marl and *tere-houille*, mixed in equal proportions, and moistened and worked up afierwards with water in which there has been dissolved sea-salt, in the proportion of five per cent of the weight of the matters composing this manure.

These ingredients afier having been well worked up, are made into bricks, which, after being burnt, on exposure to the air *if they have been well managed*, fall into powder in the same manner as lime when slaked, and offer to the sight, touch and taste, whitish, light, and alkaline ashes.

During the burning of these bricks, which must necessarily be done with pit-coal, the sea-salt is more or less decomposed, and is converted into *sub-carbonate of soda*, which constitutes the base of this manure.

You conceive, gentlemen, that to manage this manure in the manner indicated, and to advantage, it is desirable to be in a country where coal, [*houille*,] coal earth, (*terre-houille*,) calcareous rock, and marl, are abundant; however, for want of marl, its place may be supplied with mud from ponds, or the bottoms of canals, and even with light earth of a clayey nature. In places without *terre-houille*, and where peat abounds, this may be substituted.

The presence of these combustible matters, besides their fertilizing properties, contributes powerfully to the calcining and burning of the substances with which they are combined under the form of bricks, and to their conversion into ashes; in this respect they are of a double utility.

So far we see that this manure is composed of a salt analogous to that contained by the peat ashes of Holland, and of substances acknowledged to be good improvers of the constitution of soils, to wit, of lime, ashes, dead coal (*terre-houille*,) and of marl, which is rendered more fertilizing by the effect of fire. This however is not all; and although in this state even, agriculture might derive great advantages from it, another substance not less fertilizing than the foregoing constitutes a fourth part in the composition of this manure; but before speaking of this, we must say something farther of the others.

The effects of the ashes of Holland, are to be attributed solely to the action of the *sub-carbonate of soda*, which they contain. The presence of this salt is manifest in my manure, and constitutes its base.

If the use of chalk, of marl, and of the ashes of coal-earth, produces good effects as a manure, how can we refuse to admit that the union of these same substances joined with a salt analogous to that contained in the ashes of Holland, ought necessarily and by stronger implication to unite great advantages. Such is my manure. The use of the ashes of the *terre-houille* is scarcely known except in the countries where this substance serves as fuel to the inhabitants, who are also accustomed to mix these ashes with lime and with vegetable and animal matters to improve their fields and meadows, and they frequently, even use the ashes alone with success.

Before the introduction of the ashes of Holland into Belgium, which occurred in 1731, the use of the ashes of *terre-houille* was more general. They employ in Hainault, Flanders and Picardy, not only these ashes for the improvement of the soil, but also the terre-houille itself and rich coal [*houille-grasse*] as it is taken from the mines, but after having reduced it to powder. We may be convinced of this by taking a glance at the *Encyclopediæ ou Dictionnaire raisonne des Sciences, des Arts et des Metiers*, at the word *houille*, where a long dissertation on the use and fertilizing qualities of these substances can leave no doubt of the correctness of what has been stated.

Long before that article met my sight, I was aware that rich coal possessed this quality, and I had employed it in the composition of my manure: this I was induced to do, by the following considerations:

I knew that coal by distillation in a close vessel afforded, as mould does, much *hydrogen gas, carbonic acid gas*, bituminous oil, and some earthy and saline principles: and as soils owe their fertility only to principles analogous to those of mould, I concluded that coal, the decomposition of which should be favored by its minute division, by its mixture with the ashes of the bricks of which I have spoken, and by the combination of its bituminous oil with the alkaline salt of the ashes as well as by the concurrence of the action of air, water and heat, would contribute powerfully (these combined substances being applied to the growing agricultural productions,) to the development and growth of the plant. Now, as all the matters proceeding from the decomposition of vegetable and animal substances are manures, and as these matters contain a quantity of fat, oily and other

inflammable substances, I have been induced by the similarity of the proprietors of these matters with those of rich and bituminous coal to make it one-fourth part in the composition of my manure, and the effects have answered my expectations.

Such are the substances which enter into the composition of my manure. Besides its fertilizing properties, this manure by its frequent application modifies the constitution of soils, disposing them by degrees to a greater fertility. This modification results from the matters of which this manure is composed, (with the exception of the salt which is dissolved, the bituminous oil which is dissipated, and some other elementary principles which are assimilated to the plants,) becoming intimately combined with the earth of the improved soils and changing their nature by the mixture.

Experience having shown that no good cultivation can be based on any sort of land of a silicious, calcareous, or argillaceous nature, if it is not modified by others of opposite nature, and that the best soil is that which offers the greatest variety of mixtures; it follows hence, that every agriculturists possessing soils of the nature of those mentioned, has an interest to improve them by this manure, composed of several substances, having the property of modifying soils at the same time, that it augments their products. It is thus, that sterile soils may be enriched; and I have no doubt, that if this manure were spread in abundance for some years, on certain uncultivated tracts of Ardenne, we should soon see them clothed in a rich and verdant robe, and offering to the astonished eye, a spectacle as gay, as it is now monotonous. it is plain, that to improve soils and multiply their products, is at the same time to increase the number of cattle, and the quantity of natural manures, to add to the perfection of men and beasts, to augment the market value of the land, its rent, and the revenue of the state; finally to enrich agriculture, the most certain source of national prosperity.

Such are gentlemen, the advantages which will result from the repeated and continued use of this manure, which is much less costly in price, than the ashes of Holland. The quantity to be applied, is the same from 1,000 to 1,500 kilogrammes per hectare [or from 950 to 1400 lbs. the English acre.] The agriculturist ought not, however, to deceive himself with regard to the immediate effects of this manure; they can only be the consequence of its repeated application. It ought to suffice him, that he will be more than indemnified for his expenses each time he applies it by the increase of his crops, an indemnity which is augmented the oftener he repeats the use of this manure, and by the constantly increasing melioration of the soil, which it modifies and fits for a greater degree of fertility.

* * * * *

To extend the use of this manure, I would willingly grant, on favorable terms, to such persons as should desire it, the right to manufacture the article, and I dare to hope that you, gentlemen, will be disposed to exert your influence to attain this object, which, being accomplished, would save annually to Belgium, a million of florins employed in the purchase of about four millions of *cuvelles** of ashes brought from Holland. Although all the advantages which result from the use of this manure are not yet demonstrated by experience, I do not the less hope, gentlemen, that from a knowledge of the substances of which it is composed, you will be convinced that this native production may advantageously substitute the ashes of Holland, and that you will represent it favorably to the government.

Persuaded that the good effects of this manure will not escape your observation, and that agriculture, the imperishable source of wealth for our fine country, will always be with you, gentlemen, an object of especial solicitude, I shall await with confidence the issue of your deliberations on this subject, and the consequence which should thence result for the public good.

* The cuvelle, according to Sinclair's account of the use of Dutch ashes in No. 6, (p. 376) of Farmer's Register, appears to be rather more than two English bushels.

ON MANURES FROM COAL, AND DUTCH ASHES.

To the Editor of the Farmers' Register.

University of Virginia,
20th Nov. 1833.

In answer to your questions, I have the honor to state, that *houille* is a name generally given, by the inhabitants of French Flanders; Hainault, and in the neighborhood of Liege, to the substance called *charbon de terre* in other parts of France, which you know answers to our pit-coal. *Houille grasse* is that coal which contains most bitumen, (*carbon de terre bitumineuse.*) *Terre de houille*, or *terre houille*, or *terres houilles*, is a very black earth, probably in a state of transition between peat and pit-coal: it is found of various qualities, according to the presence or absence of more or less sulphur and bitumen. It takes sometimes a considerable heat to kindle it, but lasts long in burning; it produces neither flame nor much smoke, but it emits sulphureous effluvia of such a suffocating nature as to render it unfit to be used in dwelling houses for firing — — —. I think, sir, that this would be answering, to the full, the questions put to me; but considering the quarter from which they come, I fell it somewhat incumbent on me to say a few words more on this subject.

The Dutch have for years made use of the ashes of a kind of peat highly bituminous, found in different parts of Holland, as an efficacious manure. These ashes, under the name of *cenders de mer*, having long formed an article of commerce between Holland and Flanders. Agriculturist from the latter country, as well as others from Brabant, Hainault, and even Picardy, have purchased these ashes for the purpose of using them as a manure, the efficacy of which was known and acknowledged a good time ago. But the article being expensive, several persons tried to discover peat in their neighborhood, and some were so far successful in their search, as to find near Amiens a kind of peat (*tourbe,*) the ashes of which were used as a manure like the *cendres de mer*, but with less efficacy. At last a fortunate chance brought to light a matter even more useful yet to agriculture than the *cendres de mer* of Holland. The matter was found in the year 1753, at the depth of twenty to forty feet at Beauvains near Noyon, whilst boring for coal. It was also found near Laon, on the lands of Suzy, Fauconcourt and Lessieres in 1756, whilst

searching for earths and sands fit for manufacturing glass-ware.

Several intelligent agriculturists, from certain appearances of similarity with the peat of Holland that furnishes the *cendres de mer*, supposing that these black earths might contain the same ingredients which renders the said *cendres de mer*, so efficacious as a manure, burned them and employed the ashes as a manure on their meadows. This operation had such a happy result, that it was soon followed by other experiments equally, or even more prosperous in their consequences.

This induced a number of persons to form a company for the sake of obtaining the privilege of digging for this substance, and the king soon after granted them a charter to that effect.

This coal or carbonic earth (*terre houille*)is always sulphureous, and more or less bituminous. In analyzing it, vitriol and some alum are found, but no nitre. When left in heaps after it has been dug from the mine, this *terre houille* gets hot, and after some time takes fire by itself, burns whatever comes in contact with it, and emits a strong odor of sulphur. It is thrown into shallow pits where it kindles, but without any flame, and burns till the whole is reduced to ashes, which are then carried away and used as a manure.

This *terre houille* has also been used as a manure without being reduced to ashes, and has been found to answer quite as well as the ashes. In this case it is beaten into a course powder, and the land covered with it to the thickness of an inch. The employment of this coal either as dust or as ashes, has proved so very advantageous, that it has become, in France, where it can be had, almost general. Various experiments have been tried on different kinds of grains, vegetables, and even fruit-trees: they every where have been attended by the most surprising effects on the vegetation. But by far the most astonishing results from the use of this manure have been produced on the clover, lucern, and sainfoin, of which most artificial meadows are formed in Flanders.

Considering these effects, as astonishing as they are advantageous to farmers, some theorizers have imagined that the sulphureous acid, contained in these unburned carbonic earths, being developed by the rain water, forms with the bitumen, which they also contain, a new compound, which with the soil constituting the basis, is the true manure, and does all the good —— —— it may be so.*

G. BLÆTTERMANN.

ON MANURES FROM COAL, AND THE TURF OF SALT MARSHES.

To the Editor of the Farmers' Register.

Columbia, (S. C.) November 21*st*, 1833.

I have duly received your letter of the 13th inst. and give you with pleasure, the very little information I possess on the subject of the *houille*. In my native place, the black-smiths used nothing else in their forges but a pit-coal, which was there only known generally by this name, and I believe it was obtained from Flanders. The *houille* used there was always, as far as I have seen, in a crumbled state, and I do not remember to have seen a piece of it as large as my fist. It seems to me, that it was highly bituminous, as heat very soon made it cake into a hard mass, and if I recollect right, it yielded very little flame in the forge. These are, however, the imperfect recollections of fifty years. On referring to the French "Encyclopediæ, or Dictionaire Raisonne des Sciences, des Arts et des Metiers." I find a mention of the different names used in the "*Journal d' Agriculture*," &c. *Houille*, *houille-grasse*, and *terre houille*. That termed "*grasse*" seems to be thus distinguished by its being the most bituminous,and to have been long supposed to act as manure, and that in proportion to the quantity of the bitumen it contains. As regards the *terre houille*, the description of it is rather unsatisfactory; but it is undoubtedly a mineral coal also, perhaps of more recent formation. A very curious fact is stated of it, which I here translate. "The result of this examination " is, that in England and in Flanders, the ashes of " mineral coal have been used to augment the pro- " duction of meadows; that the peat-ashes, called " in Holland "sea-ashes," (cendres de mer,) have " since been used for meadows, as also for lands " sowed with seeds of fodder plants; that they " have also used the ashes of the peat of Amiens " and other countries,and that the earths and ashes " of *houille*, found in that district of country, at " the three places here above designated (Suzy, " Fauconcourt and Lessieres,) appear to deserve " the preference, not merely on account of their " proximity, but also of their efficacy, because " they possess a higher bituminous quality, which " is the surest improver of the land. The effect of " these different ashes, proves generally, that all " saline and bituminous manures are preferable to " a drier earth, such as marl or *crau*, [I cannot " find what this last is,] the effect of which is only " to dilate the tenacious soils by dilating them- " selves in damp weather. The use of marl, " which is very expensive, has even been found " dangerous. The *terres houilles* are sulphurious " and bituminous; by decomposing them, they " might be found to contain vitriol, and perhaps " allum; but no nitre; the bituminous part, is the " true manure."

" *This terre houille, if it is left for a few days* " *in a heap, as it comes out of the mine, gets heated,* " *takes fire of itself, and burns what is in contact* " *with it, and spreads afar an odor of sulphur.*

" *To reduce it to ashes, it is put into a ditch or* " *pit, where it ferments, and takes fire without any* " *apparent flame. If it contained nitre, it would* " *produce flame.*

" This terre houille may be used, either as it " comes out of the mine, without having been either " burnt or calcined, or after it has been burnt and " reduced to ashes, &c. &c. Any one may find " out by a simple experiment, if the black earths " which are supposed to be terre-de-houille, are " truly such. Take a lump of it as large as a me- " lon; place it, without breaking it on live coals " on the hearth; if it is terre houille, it will take " fire like spunk without flame, spreading a suffo- " cating odor of sulphur. If it produce a flame,

[*We should infer that benefit being obtained from pit-coal as manure, or from anything that produces either sulphureous or sulphuric acid,must depend on the soil being calcareous, in which case gypsum will be formed. But if no lime is present, or not enough to take up the sulphuric acid, the effect of that acid, whether alone, or combined with either the iron or alumine (pure clay) of the soil, will be decidedly injurious to growing plants.]—*Ed. Farm. Reg.*

"the earth contains too much sulphur and should "not be used except burnt and reduced to ashes."

The account continues and relates circumstances in proof of its merits, as a manure; but, I presume the above extract is sufficient to show that it is something very analogous to fossil or mineral coal, if not coal itself. I do not know the properties of the Virginia coal; but if it is highly bituminous, as that described above, it is highly probable that the immense quantity which is now unsaleable on account of its being too much broken, may prove an invaluable source of manure. Its effect on various qualities of land may easily be tried. It appears to me, to be well worth the trial. You must observe that the above extract was written near a hundred years ago, and that the experiments that have been made since, an account of which can best be obtained from that country, may give a somewhat different vew of the merits of the substance in question.

From the circumstance of the great and undoubted value of the Dutch ashes, and of the particular name "*sea-ashes*" by which they are known in France, &c. I should form a favorable opinion of Mr. Hollert's composed manure. Its having marine salt as one of the ingredients must approximate it to the Dutch ashes which are made of brackish peat, and it is believed that the beds of coal, some of them at least, were originally beds of peat. The *houille* I understand, contains many vegetable impressions. All these indications seem favorable for experiments in a country where coal-mines abound; but I would go father, and propose experiments being made on the sea-coast, and wherever the sea has formed salt marshes. Is it not possible, nay probable, that these salt marshes which are many of them, of no value at all, are nevertheless an immense source of wealth? A foot or two or more in thickness, might be cut into square lumps, dried, formed into kilns and burnt, which would most probably make a manure light and rich enough to be carried hundreds of miles by water carriage, and after awhile by rail-roads. The marl, shells, &c. are too heavy and bulky to be carried as far as ashes might be, and by means of both, nearly the whole country, from the seaboard to the mountains, these included, might be permanently benefited, and our Atlantic country induced to retain its inhabitants by finding at home, either a fertile soil, or the means of rendering it so. The preventing a too great emigration from any country is, I think, an object of the utmost importance, and every proper means should be used to put, at least, limits to it.

N. HERBEMONT.

PERSIAN METHOD OF MANAGING SILK-WORMS.

From Goodsell's Genesee Farmer.

The Asiatic method of managing silk-worms is preferable to that formerly practised on the Aktourba, where much time and expense were wasted in feeding the sik-worms with gathered leaves, which soon decayed and rendered the frequent shifting of their beds necessary. The Persian of Boukharian rears his mulberry-trees, to about six feet high, which they attain in four or five years, he then begins to lop their tops and branches, which are given to the insects, as soon as they have sufficient strength, by placing them gently on their beds. By this means the shoots remain fresh and succulent, and the worms devour them even to their woody fibres, so that no part of the nutritive foliage is wasted. As these insects are every day supplied with food, the leafy branches gradually form a kind of wicker work, through which the impurities pass, so that the cheerful worms preserve the requisite cleanliness without trouble to the cultivator, and speedily obtain a vigorous state. In this manner they are continually supplied with leaves, till they prepare to spin, when small, dry brush wood is placed in all directions over the leafless branches: on this the worms spin their silk. Two persons, an adult, who lops the branches, and a child who collects them, are thus enabled quickly to procure food for a great number of silk-worms.

The mulberry tree, in our climate produces new shoots twice in every summer. These shoots acqure, in the same year, the firm consistence of wood. In Persia and Boukharia, where the summer is longer, and the vegetation more vigorous, the shoots may be even cut twice a year. The tree, by this method of cutting, always remains low, and produces a greater number of young shoots from its trunk, as well as from its branches, every subsequent year.

By stripping them of their leaves, however (on the contrary), many branches wither and not only the buds are lost, and much foliage wasted; but the worms receive less nourishment, as the leaves sooner decay. It has been remarked, in the silk establishment near Aktourba, that the worm, when compelled by necessity, eats leaves of the ACER TATARICUM, which resemble those of the mulberry tree.

SULPHURIC ACID SPRINGS.

The second number, vol. xv. of the American Journal of Science contains an account by Prof. Eaton, of certain springs of water, impregnated with sulphuric acid, in the town of Byron, Genesee county, N. Y. One of the springs emits a perennial stream, sufficient to turn a light gristmill, and is so acid as to coagulate milk. The fact is the more remarkable, as but two other instances of the kind are known, and both of these in volcanic regions.

For the Farmers' Register.

SYSTEM AND PRODUCTS OF FARMING IN COLUMBIA COUNTY, NEW YORK.

To HILL CARTER, Esq. *of Shirley, Va.*

SIR,—As a farmer who feels a deep interest in the successful prosecution of his business, I take the liberty to address you. Through Mr. Ruffin's Register, I have become acquainted with your excellent management of the Shirley farm; and although I have a northern, you a southern location, and there are hundreds of miles between us, yet as we follow a common pursuit, we must both feel interested in its further advancement. As a farmer then I acknowledge myself deeply indepted to you for your valuable communication, for I find in it, that good farming upon similar soils is very much alike, whether it is conducted in New York or in Virginia. I confess that heretofore I had not put a proper estimate upon southern farming; from the descriptions I had so frequently heard of the poverty of the soil, and the distress of its inhabitants consequent upon it, I thought the south was one barren sandy waste, with hardly a

redeeming quality, except in the genius and patriotism of its people; but as I became better acquainted with it, I am pleased to see that at least there are green spots here and there upon which the eye can rest, and that there are persons upon them competent not only to manage successfully the multiplied operations of their individual farms, but to give practical lessons of profitable husbandry to the population by which they are surrounded.

If the high destiny of great conquerors and statesmen does not await these men, they will have a more useful life, and enduring monument, in the increased wealth and happiness they will impart to the respective portions of their country: and where agriculture can have the benefit of such examples, their effects will be observable upon all within the sphere of their names and influence—for barrenness will be turned into fruitfulness, and there will be health, and wealth and happiness, where before were disease, discontent and poverty. Let them but persevere, and the time is not far distant when the farming of the state of Virginia will bear a comparison with that of any state in the union.

With this preliminary, I will now state distinctly the object of this communication; and that is, as you sir, have given me the opportunity of becoming acquainted with your method of farming, I feel bound to discharge the obligation, and as far as I am able, to make known to you mine. Whether the soils we cultivate are similar, I cannot undertake to determine; but presuming from your description of your farm that it is sandy, and has once been covered with pine timber, I have only to say that mine is level land, situated on an extensive plain, of which almost the only timber was the pitch and yellow pine. I take it for granted therefore, that whatever system of farming (allowing for the difference in situation,) is profitable in the one, will hardly be less so in the other; and if, by an interchange of each other's practice, new light is shed upon any one subject of husbandry, we shall both be gainers.

My farm, with thousands of acres around it previous to the introduction and use of clover and plaster, was not worth more than three dollars per acre, and it might all have been bought at that price: but the improvement that has taken place from the use of these two articles, connected with an intelligent cultivation of the soil, has so far increased the value of this land, that at this day, with moderate prices for its products, it will yield, free of expense, the interest of more than one hundred dollars per acre. This improvement has been gradual, but it has been steady—and what was formerly looked upon as an unprofitable sandy plain, with here and there a poor inhabitant, now teems with life, intelligence and wealth. It is the land most sought after, because it best repays the husbandman from the fertility that has been imparted to it. Of this he has the strongest evidence in the appearance of its houses and barns, its stock-fences and roads. The ease, celerity and cheapness with which it can be cultivated, are additional arguments in its favor—and although its fertility is all artificial, yet the most experienced have the utmost confidence in its powers, because their capacious barns have often borne evidence that their industry upon it has not gone unrewarded. The change that has been wrought is the strongest proof of what industry with intelligence will accomplish; and although we do not pretend that we have reached, or even yet approached the *ultima thule* of good farming, yet we rejoice in our success, and would feel happy if our practice and experience could be beneficial to others.

I will now advert to my farm, and enter at once into its arrangement. I came into possession of it in 1815. It consisted of one hundred and twenty five acres, all in one lot: half was cleared and in rye, the remainder was covered with stinted pines. The part in rye was put down in the spring to clover, sown with plaster; and the first having taken well, things soon assumed a new aspect—for in two years, from this same field which did not yield five bushels of rye to the acre, I have harvested fifteen busbels of wheat per acre. Since then, the farming upon the whole has been simple—never at most to take off over three crops from a lot before it was again seeded with clover, and plaster was commonly applied to all the lots every year. The effect of this treatment is not as discernible now as it was at its first application; still we have yearly evidences of its continued beneficial effect.

The stinted pines on my lot were removed as the land was wanted; and although I cultivated at first with only an outer enclosure, I soon found there were many inconveniences and losses attending it, and I now have it fenced off in about ten acre lots. By adopting this plan, I find it much easier to get along with my stock; for whilst they are benefited by the superfluous herbage, they impart a fertility to the soil by the droppings of their manure, and save the expense of soiling—whilst I can take advantage of each lot either to pasture, plough, or keep it for hay. There is no waste ground therefore, that runs to weeds, because the land adjacent is in a corp and cannot be used; each successive lot bears its share of what constitutes the rotation of crops on the farm. This division of a farm into several lots generally obtains here, and farmers find the great benefit of it, as all the arable part of the farm comes successively into cultivation, which improves it, and any part may be taken either for hay or pasture at any time most convenient to his interest. Standing pastures formerly in use are not known on our best farms. Since artificial grasses have been used, we find that one acre put down carefully with grass, now yields as much herbage to beasts as ten acres did under the old system; and that not only a much larger portion of the farm is thus brought under the use of the plough, but that it adds materially to the profits of the farmer. By this practice he is likewise enabled to have a succession of pasture lots through the season, and these several lots thus pastured become highly fertile by the sward which has been thus artificially created. But it is not only in the increased fertility of the soil that we are gainers. The cattle by this abundant supply of food are much more serviceable, both for labor and the profits of the dairy; and stock thus treated are in a few months abundantly fat for the butcher. It is not found profitable to feed too close, and stock is not turned in until the grass has become somewhat rank, and then enough is left to afford nutriment to the next crop of grain that may follow. Clover is the grass most commonly used, and if gypsum is applied to it, it grows with a rankness and luxuriance, that if when ripe were trodden down, would cover the ground for inches. There is, however, a difference in the kinds of clover seed, and we prefer in all cases what with us

is called the western, to the southern seed, because the first affords triple the quantity of herbage, which is the great desideratum, whether we want it for pasture, hay, or a lay to turn under. The southern ripens sooner, but it gives too small a bulk to be as profitable as the western, and we cannot think of sowing the one, when we can even if it is at a high price, obtain the other.* But it is not clover only that is used; timothy is often sown, particularly for land that is to remain for any time in grass; and while the first is always sown in the spring, the other uniformly does best if sown in the fall. So common has the practice become to use artificial grasses, and so useful have they been found, that many farmers will sow clover seed with their spring grain, even if they intend to take a crop from the same lot the succeeding year; and I have a lot now in my eye, which was in wheat with clover seed sown in the spring of 1832, that this year, 1833, bore a very good crop of corn. This however, is not advisable farming, but it is occasionally done by those whose farms are small. It is a conceded point by all our most intelligent farmers, that the best and surest preparation for a grain crop, is a clover sod that has lain for a year or two. Stable manure will add to its fertility, and enhance the product, but the sod is of much more importance to the succeeding crop, if taken singly, than the manure. There is an ameliorating and a fructifying quality about the sod that imparts its powers to the grain that succeeds it, which is not so discernible in the properties of the manure; and in dry seasons, the effect of the last are almost entirely lost. To plant our corn therefore on a clover sod, or to sow our wheat upon it, are great desiderata. Thirty years experience has amply satisfied us that the ground so prepared, yields by far the most abundant returns. A rotation of crops is adopted, but not adhered to with that punctilious observance as to rule, that I see obtains among your best farmers—inasmuch as we are more governed by our opinion of the strength of the ground to produce the desired crop, than by any regular rotation; and while at the same time we are so careful not to exhaust the soil of its fertility, as often not to take more than one, sometimes two, and never more than three grain crops from a lot, before it is again put down to grass. It appears to be a law of nature that an animal or plant will not feed well on its own remains; so of clover, without the ground is in a measure exhausted of its remains, the seed does not, in the first, take, and in the second place, do well. As clover is so generally used upon these plains for pasture, and for imparting a fertilizing quality to the soil, we are careful when it is used for pasture not to crop it too close; and therefore it is considered essential to the interests of the farmer that his stock of cattle and horses should be as small as is consistent with the careful tillage of the soil and the uses of the dairy. As small a number of these animals therefore, is kept, as can easily be supported—but not so with hogs: in summer they do remarkably well on clover—after harvest, they have the droppings of the grain in the fields—in the commencement of autumn, they have the benefits of the orchards with which almost all our farms are supplied, so that they require but little corn to finish their fattening.

I have thus given you an abstract of our method of farming. If it is of any service in the suggestion of a single idea that may be useful towards the management of a similar kind of soil elsewhere, I shall feel myself amply compensated for this communication. I have appended to it the agricultural report of the products of a farm in my neighborhood for the last year; and as the method of farming which obtains here, is very uniform among our best farmers, it may be taken as a proof of the success of our practice. The product from this farm is not taken because it is an evidence of the most successful cultivation. I have no doubt—indeed, I know that there are many farmers in this vicinity who have been quite as successful; but this gentleman, having acquired a competence and just sold his farm at sixty dollars per acre, we have a fair criterion to rate the percentage of his farming investment.

Most respectfully, yours, &c,

J. P. BEEKMAN.

Kinderhood, Columbia County, New York, Dec. 20th, 1833.

SIR,—At the solicitation of a friend, I am induced to give a statement of the products of my farm for the year 1833, and of its general management. In doing this, as my grain is not yet all thrashed and taken to market, I cannot now arrive at perfect accuracy; but, from what is thrashed and sold, I can make a correct estimate of the quantity, and I have ascertained the price for such as has not been actually sold.

My farm is situated on an extensive plain that was once covered pretty generally with small pine timber. The soil is sand, occasionally gravel, and more or less mixed with loam. It consists of about two hundred acres, of which thirty are in wood, twenty in meadow, and ten acres of waste, leaving for cultivation about one hundred and forty acres of arable, or land used for the plough, which is divided into seven lots of twenty acres each. One of these lots is planted each year in corn, on clover sod: the corn is the large twelve rowed early yellow, and my usual produce is about fifty bushels per acre. My mode of cultivation is, that after the lot has lain one year in clover, to plough it the last of April or first of May; about six inches deep—then furrow both ways with a light corn plough, the first time across the furrows about two feet nine inches apart, and the next about three feet. I plant immediately after furrowing. As soon as the corn is up the length of the finger, I harrow it with a large heavy harrow, lengthwise, with the furrow, as the ground was originally ploughed, and take two rows at a time. Two men or boys follow the harrow with aprons, out of which they plaster the corn—and also to raise any plants which may have been thrown down by the harrow passing over them. In about a week after, I plough once between the rows, as they are planted the narrowest way; the men follow with the hoe, and they will finish twenty acres in ten

[* If the western and southern clover seed here spoken of, are so named merely from their origin, (and not as being different varieties,) the great difference in their products presents a striking proof of the truth and value of Dr. Bronn's theory of the "Influence of the origin of seeds, &c." See p. 257-8, No. 5, Farmers' Register.] —*Ed.*

days. In a fortnight more, I plough it the widest way of planting, twice between the rows, and throw the ground towards the plant. I cut the stalk above the ear as soon as the kernel in the ear is hard, and secure the stalks in shocks. We husk the corn on the hill, and two men will gather 100 bushels of ears in a day. The lot which was in corn I put down the succeeding year to oats, and it usually produces about 40 bushels per acre. This lot I seed down with western clover seed about eight quarts per acre. Two lots are in wheat, which were likewise the year previous in clover sod. The one was ploughed the first of August, and again just previous to sowing in September; the other but once the last of August, or first of September, about a fortnight previous to sowing: these lots had the benefit of my barn manure which was scattered over such portions as I thought required it most. I commonly sow about one bushel twelve quarts per acre, and my common yield is about twenty bushels of wheat per acre. Thus four lots are employed; one in corn, one in oats, two in wheat; the remaining three are in pasture—making seven, (besides the meadow.) Two of these are again to be ploughed up in the fall for wheat, and the remaining one is for corn the succeeding season. The experience of twenty years has confirmed me in the belief that this is the most successful mode of cultivation for our soil, and I have at all events been satisfied with the amount of produce my farm has yielded me. I annex a statement showing the amount of produce, and the proceeds therefrom, of my farm, for the year 1833.

CR.

20 acres meadow, 2 tons hay per acre, sold at $7 50 per ton,	$300 00
20 acres producing 1000 bushels corn, at 62½ cents per bushel,	625 00
40 acres producing 800 bushels wheat, at $1 06¼,	850 00
20 acres producing 800 bushels oats, at 37½ cents,	300 00
500 bushels potatoes at 25 cents,	125 00
3000 weight pork, sold at $5 50,	165 00
Sold one beef,	25 00
500 weight butter at 16 cents,	80 00
225 lbs. wool at 50 cents,	112 00
55 lambs, increase of my flock,	80 00
The item of pasturage not put down,	
	$2662 00

DR.

To hiring 1 man per year at	$100 00	
To do. do. do. 7 months,	70 00	
To hiring 15 days in harvest,	13 12	
3½ tons plaster, at $7 50,	26 25	
3⅓ bush. clover seed at $7 50	26 25	
Taxes,	15 00	
Mechanic's bills,	50 00	
		320 62
Income,		2341 38
The farm sold at $60 for two hundred acres,	$12,000 00	
Stock for working the farm and implements,	1,000 00	
	$13,000 00	
Interest on this sum at 7 per cent,		910 00
Gain,		$1431 38

Making the entire interest upon $13,000, after deducting expenses, about 18 per cent.

There are other profits from the farm not enumerated in the preceding statement, such as house rent, garden, orchard, raising of poultry, &c. I will put them against any little incidental expenses not enumerated, but which they will be amply sufficient to defray. The labor upon my farm is performed by two men as above stated, but under my own direction, and all our operations tend to lessen the amount of labor as much as practicable, and I find that nothing conduces more to this result than to keep ahead of my work through the season. For myself, I labor but moderately, but keep up a constant supervision. I will only add, that since I have adopted the principle of total abstinence from ardent spirits at all seasons of the year, I think I have not only gained vastly in the amount of work done by my men, but my farming business has gone on more cheerfully.

Yours respectfully,

TEUNIS HARDER.

Columbia Co. N. Y. Dec. 18th, 1833.

[The writer of the first of the two foregoing communications, fills the honorable station of Corresponding Secretary of the State Agricultural Society of New York, and is no less distinguished as a scientific agriculturist, than successful as a practical improver and cultivator of the soil. It is not only for the intrinsic merit of his comunication (which needs not our comments,) that this new correspondent of the Farmers' Register is most welcome—but also as indicating the commencement of a friendly and instructive interchange of opinions, and results of practice, between very distant members of the agricultural community. In this respect, we hope that the example of Dr. Beekman will not be permitted to stand alone—and that many others will be as ready to join in this plan of exchanging information—a kind of trade by which many (if not all) will gain, and none can possibly lose.

Notwithstanding the general opinion to the contrary, we are satisfied that there are as good farmers in Virginia, as perhaps in any part of the world—meaning by that term, individuals who combine sound theory with the practices which are most judicious and suitable to their situation and circumstances, and who derive the best profits from their capital, counting the improvement of their farms as well as the amount and value of annual crops. But it must be confessed that these bright examples are "few and far between," and are exceptions to our general practice. Besides—such farmers are almost confined to good lands, (or such as were originally fertile,) and their management has been deemed unsuitable to poor soils—and therefore such examples have had no very extensive influence. Yet it is precisely upon the great body of our lands, where these examples have had almost no effect, and where there has been scarcely any good farming, that the greatest improvements may be cheaply made, and the greatest profits are in prospect to all who will attempt a proper course to reach them. The statements of Dr. Beekman, and of Mr. Harder, especially deserve the attentive consideration of the cultivators of the poor sandy soils of the tide water region of Virginia (and the Carolinas) which poor as they are, are not worse in quality, or in appearance, than the soils described in the forego-

ing letters were, before their artificial improvement. Much of this land in Virginia, lies over, or is convenient to beds of fossil shells, which offer for the first improvement, a facility far surpassing any of the early resources of the farmers of Columbia—and the use of this calcareous manure (so far as our personal experience teaches,) will create in our poor soils, a power to be equally benefited by clover and plaster. We cannot understand why the same skill and industry which has raised the value of the Columbia lands from $3 to $100 the acre, would not as surely raise ours from $2 to $40 or $50. If a *colony* was formed in Lower Virginia of such men as Mr. Harder, by the purchase and settlement of a body of our poor land, (so extensive that they could fully pursue their own practices, and not in any way be influenced by others,) by using the proper means for improvement, they would speedily enrich themselves by their profits, and greatly benefit our country at large by exhibiting such evident examples of successful farming, as could not fail to make the selling prices of lands, approach the amount of their intrinsic value.]

MEMORIAL OF THE CONVENTION UPON THE SUBJECT OF INTERNAL IMPROVEMENT; HELD IN RALEIGH, NOVEMBER, 1833, TO THE GENERAL ASSEMBLY OF NORTH CAROLINA.

To the Honorable the General Assembly of North Carolina.

The memorial of a convention upon the subject of internal improvement, in which were represented forty-eight counties of the state, respectfully sheweth:

That, according to the appointment of their respective constituents, the members of the said convention assembled in the city of Raleigh, on Monday the 25th instant, and have continued their session to the present time. That early in the session, a committee was raised, consisting of a member from each congressional district of the state, to which was referred the general subject of internal improvement for the state of North Carolina, from which, through their chairman, Duncan Cameron, Esq. the convention received the following report, to wit:

"The committee to which was referred the general subject of internal improvement for the state of North Carolina, report to the convention as follows:

That they have duly considered the several matters referred to them, and after a full conference and comparison of views, they trust that they have been enabled to digest a plan, which, if not perfect in itself, is at least the best that they can reasonably hope will be carried into execution.

It is no doubt obvious to every thinking man, that no plan could be devised entirely acceptable to all, or, perhaps, in all its details, acceptable to any one; while it is equally apparent that unless something is done to accommodate all, or nearly all, without an entire change in the principles of human nature, that hearty support and concurrence from the different sections of the state, so essential to ultimate success in our undertaking, cannot be expected.

It was necessary, therefore, that the plan devised by the committee should be as wide and general as the wants of the state require, and its means are sufficient to accomplish. The state may be considered as divided, in its present condition, by five distinct sectional interests, viz. first, what are called the northern counties; secondly, the Tar river and Neuse counties; thirdly, the counties usually trading to the towns on the Cape Fear; fourthly, the extreme western part of the state; and, fifthly, the middle counties, lying on the Roanoke.

To obtain the support and countenance of these different sections, as well as to accomplish our design of general utility, the interest of all these sections must be consulted and attended to. The committee thought it rather calculated to excite discord, and to cool the ardor of those whose views might not be fully met, to be at this time specific in the recommendation or rejection of any of the plans which have been referred to their consideration; every one of which may perhaps be, in itself, highly worthy of public patronage; but, from their multitude, beyond the reach of the means of the state to accompilsh all, and, from their peculiarly local character, not well calculated for incorporation into any general system of internal improvement. But to meet the wants, in part, of the people of the northern counties, and those lying below Halifax, upon the Roanoke, they recommend a communication from Edenton by rail road, intersecting with the Portsmouth rail road to Roanoke, or by canal with the Dismal Swamp Canal.

To accommodate the people on the Tar and Neuse rivers, they recommend the cutting a ship channel, to connect the waters of Beaufort Harbor with Neuse river. They propose further a communication, by rail road, river, or canal, or any two of them, or all *united*, from some point on the seaboard of the state, to the Tennessee line; and another communication of the same kind from some point on the Roanoke river, running southwardly, to the South Carolina line. These two latter works, it is believed, will fully answer the purposes of the other remaining portions of the state; while the whole combined will, it is hoped, meet the wants of the state at large, and all, and every part, readily fall in with, and form a part of, any internal communication which it may be hereafter thought necessary to form between the eastern, western, northern and southern portions of the union.

They do not think it expedient at this time to indicate the points of commencement or termination, on the general routes of any of these works, but recommend that a board of internal improvements should be raised, and an engineer or engineers employed, with full power and authority to plan and conduct the works according to the general outlines agreed upon. This general scheme, from its very nature and magnitude, they believe to be entirely without the range of individual enterprize, and therefore recommend its execution exclusively by the means of the state, and under the direction of its officers. While the committee are of opinion that most, if not all the specific plans referred to their consideration, are too peculiarly local to form a part of the general scheme above mentioned, they are far from being disposed entirely to overlook them; but as the selection of particular sheme or schemes, from among the number submitted as the most worthy subjects of legislative patronage, is an inviduous task, and

which, furthermore, they feel themselves very illy qualified to perform, the committee flatter themselves that by the adoption of one or two general principles they will bring all those local works, worthy of legislative patronage, within its reach; so that none may be turned away, who have claims to attention; while none will be fostered beyond their merits. To meet this view, they recommend that whenever any company shall be incorporated by the General Assembly, for any work of internal improvement, such company shall, in the prosecution of their work, be at liberty to intersect with, or cross any other work executed or to be executed by any other incorporated company or by the state; and that whenever the stockholders of any such company shall pay or secure to be paid, three-fifths of the amount necessary for the completion of any such work, the General Assembly may, in their discretion, subscribe the remaining two-fifths, for and on account of the state, if thereunto requested by such company.

The committee have endeavored to form an estimate of the amount necessary for the full accomplishment of the foregoing scheme; and after mature consideration, they feel very confident that five millions of dollars will be a sufficient allowance. This sum will not be required in greater instalments than one million of dollars per annum; perhaps much less may serve.

Whatever amount may be required, cannot be raised otherwise at this time than by loan. This, the committee is informed, may probably be obtained at a rate of four per centum per annum; but it is believed that the rate can, in no event, exceed five, if proper measures are adopted to provide for the regular payment of the interest. The committee does not doubt that the legislature will, if it should so happen that the resources hereafter pointed out shall be insufficient for this purpose, by a proper system of taxation, supply the deficiency, which the convention should recommend, and stand pledged to sustain them in, to the extent of its weight and influence in the community. In addition to the vast fund of wealth held by the state in the affections and property of her citizens, the annexed schedule sets forth sundry items amounting in all to the sum of 1,067,000 dollars, actual property, belonging to the state, and now available to a great extent; uncertain items amount to 706,000 dollars; and the swamp lands, which the committee recommends should be pledged as far as it will go to the payment of the interest, and repayment of the principal, of such sums as the state may from time to time find it necessary to borrow for the prosecution of the scheme of internal improvement.

The sum of $1,067,000, at four per cent. will yield an income of $42,080, and other annual items added thereto gives a certain available income of $51,055 per annum. Part of this sum, it will be seen, consists of effects which have been heretofore set apart for the literary fund. But your committee thinks that the great object for which this fund was originally set apart, will in no wise suffer by the proposed diversion. This fund has been for a number of years lying unused, and would probably so remain for a number of years to come, so far as the use for which it is nominally designed is concerned; and, if used immediately, it is thought that in no way could it contribute so effectually to a wide and immediate spread of really useful and substantial knowledge, as by increasing the facility of intercourse between the different sections of the state, and bringing well informed persons, bearing with them the arts and sciences, with all the improvements of civilized life, to the most inaccessible mountains and sequestered vallies of the state. A part of the fund which it is proposed to set apart as a partial security to those who may become the creditors of the state, it will also be seen consists of lands lying in the western part of the state, to which the Indian title has not as yet been extinguished. It is, therefore, desirable that this title should be extinguished as soon as practicable; and to that end it is recommended by the committee, that in some proper way the attention of our representatives in congress should be called to this subject. It is not the province of this convention to interfere with any matter which may have a tendency to awaken political differences, or express any opinion upon political questions; but your committee may be allowed to say that many are of opinion that the bill commonly called the land bill, will sooner or later become a law of the union; and, should it do so, the state of North Carolina will be entitled to the sum mentioned in the schedule; and your committee have, therefore, put it down as what may possibly constitute a part of her effects. Your committee further recommend, as the most effectual and speedy mode of carrying into execution the views and wishes of the convention, that a memorial, signed by the members of that body, be respectfully submitted to the legislature, during its present session, praying its concurrence therein, and its aid in their accomplishment.

Respectfully submitted,

DUNCAN CAMERON, *Chairman.*

Schedule of the effects proposed to be pledged to creditors of the state upon the contemplated loan.

Estimated value of bank stock,			$500,000
Do.	do.	Roanoke Navigation stock,	50,000
Do.	do.	Cape Fear do.	32,500
Do.	do.	Buncombe Turnpike,	5,000
Do.	do.	loan to Clubfoot & Harlows,	33,000
Do.	do.	Road stock Pungo and Plymouth,	2,500
Loan to Tennessee Turnpike Company,			2,000
Do.	Swannanoah	do.	2,000
Cherokee bonds,			40,000
Do.	lands in Macon unsold,		100,000
Do.	do.	title unextinguished,	300,000
			$1,067,000
Claim for military expenditures during the late war,		20,000	
Proportion of western lands,		686,000	
		$706,000	
Swamp lands without estimate.			
Annual income interest on above sum of 1,067,000 dollars, at 4 per cent,			$42,680
Entries of lands,			5,000
Taxes on sales at auction,			675
Tavern tax,			2,700
			$51,055

After a full, free and animated discussion upon the question of concurrence in the report, forty-

four counties voted in the affirmative to four in the negative; and upon motion, one member* from one of the counties in the minority was allowed to enter his dissent to the vote of his said county.

In conformity with the last clause of that report, the convention begs leave to lay before the legislature and people of the country, in a condensed form, its views and wishes upon this all important subject. The convention disclaims all idea of dictating to the legislature in the discharge of that high trust which is committed to it under our happy and wise constitution; but asks the reasonable privilege of respectfully appealing to the sound sense, the warm patriotism and high responsibility of your enlightened body in behalf of a people, of whom, in common with yourselves, they constitute a part. The improvements made in other states have awakened in our citizens a sense of their own necessity, and pointed to the means by which they are to be relieved. Through us they cry to your honorable body, for it is you alone who can do it, to put those means within their reach, and we confidently trust their cry will not be unheard or disregarded. We invoke the aid of the legislature not in the ordinary way of petitioning for charters, and praying for some pitiful contribution from the coffers of the state to aid us in the accomplishment of some trivial local object; but we come boldly forward and tell you that our plan is too stupendous for individual enterprise, too general in its utility to be the peculiar concern of any one section of the state, and pray that its execution may be exclusively directed by the parental wisdom of the state government, and the means furnished from its treasury. The first question which presents itself is, is this demand reasonable? Is it right and proper that the government of a state should undertake the accomplishment of great public works? This certainly sounds much like a self-evident proposition, and it seems difficult to conceive how a negative answer should ever be thought of. But, strange as it may seem, doubts have been expressed upon the question. The tendency of human nature is to run into extremes, and in sudden and precipitate flight from one error, a man often finds himself thoughtlessly rushing into an opposite, but not less fatal one. The extravagance of trans-atlantic governments was found to be a fruitful parent of corruption, and, therefore cheapness was early sanctified in our political history as a needful attribute of a pure one. But the evil principle complained of in those governments was not expenditures in the improvement of the country, in patronising agriculture and fostering the arts, but those made in pensioning the minions of power, in sustaining an indolent and purse-proud aristocracy, in the *sinecure* salaries of useless officers, and in cruel and criminal waste in unnecessary warfare. The commonwealth is a term strictly applicable to all republican states, and is strongly significant of the nature of their governments. They were not devised only that their citizens might be safe, but that they might be happy. Whatever man singly is incompetent to perform for his individual happiness, society was formed that it might be accomplished by united effort. Shall government, then, in practice, discard the only principal upon which it was based?

But that this convention may not be misunderstood, and supposed to assail the doctrine that internal improvement within the states is not the proper province of the general government, they beg leave to suggest that this doctrine derives its support mainly from the position, that internal improvement within the limits of each particular state, if not its duty, is at least its own exclusive right. But it is contended by some that, although a state may of right undertake such works, yet it is inexpedient that she should do so. This the convention respectfully thinks depends entirely upon the generality of their usefulness, their extent, and their unfitness for individual enterprize; and they conceive that the subject under consideration possesses all these attributes. It is assumed by some, but denied by the convention, that works can be done more cheaply by companies than by the government. It is not denied that an individual can accomplish a work within his ability with more despatch, fidelity and economy than a number, because the action of one mind is more concentrated than that of a number, and a principal will always be more astute in matters affecting his own peculiar interest than any agent. But as to companies, they are subject to all the differences, divisions and distractions of opinion with a government, and in common with it must depend upon the skill and fidelity of agents; while, on the other hand, it is certain that government engaged in extensive public works can, from its superior wealth, means of information and influence, command persons of more established fame and higher attainments to manage its affairs, than any private company, however extensive; and, from its incalculably superior credit, can command resources upon better terms, and, from its illimitable wealth, is in less danger of ultimate failure in the success of its undertakings. But, after all, our application to the legislature is to do for us what she can. She can command the resources of the government; she cannot command individuals to subscribe to stock companies. In the present state of the public mind she will be sustained in the one: she will do nothing for our relief by authorizing the other.

The next question which arises is, whether the plan we propose is worthy of the patronage of the legislature? We do not say that it is the best which could possibly have been proposed; but we do say that it is one calculated for great and general utility; that the people will receive it as commensurate to their great and imperious wants; and will sustain us in its recommendation, and you in its adoption. It has been our wish, in the spirit of republican legislation, to effect the greatest good to the greatest number; and if any portion of the state is omitted in our plan, it must be some portion that is not, in the nature of things, within the reach of direct assistance, and can therefore only be benefited by the general prosperity. If it cannot slake its thirst where the fluid bubbles from the fountain, it can partake largely of the refreshing influence of the flowing stream. We believe that its execution will bring to the door, or place within the reach of the reasonable industry of every citizen of the state, a cheap and easy intercourse with sufficient markets; and will refund to us the tribute which we have been paying to other states, by drawing to our markets the produce of some of our neighboring sisters. The convention believes that, to the enlightened body they are addressing,

[* Col. Thomas Cox of Halifax.—*Ed.*]

it cannot be necessary to show the vast advantages which have ever redounded to a state from a proper system of internal improvement, or the necessity which now exists in North Carolina for its adoption. Her wasted fields, her deserted farms, her ruined towns, her departing sons, all reproach us with supine neglect. The immense tax which North Carolina now pays in the way of extra expense in transportation of the fruits of labor to market, and bringing back necessaries in return, are sufficient to palsy the arm of industry and weigh down the spirit of enterprize. By way of illustration, we will mention salt alone. Of this indispensable article, it is stated that the county of Iredell consumes, on an annual average, 5,000 bushels. The ordinary cost of this article, in the eastern markets, is 40 to 50 cents per bushel. It now costs, when it reaches the Iredell planter 150 cents per bushel; making from one hundred to one hunded and ten cents per bushel for transportation. It is supposed that this, by rail-road, may be reduced to 25 cents. Thus showing that, upon the article of salt alone, an annual tax, for want of convenient transportation, is levied upon one county of 3,750 dollars. Suppose, upon a moderate calculation, that there are 30 other portions of the state in a like situation; and we show, by a simple process of arithmetic, exclusive of what is paid by other portions not mentioned, upon the same article, there is an annual drawback, upon the labor of the state, of 112,500 dollars. Carry out the principle, and the mind would be overwhelmed with astonishment in the computation. It is said that the counties on the waters of Roanoke, Neuse and Tar, pay, on transports, annually, by reason of their extra difficulties. 335, 000 dollars. Upon this point, the convention thinks it unnecessary to dwell.

Admitting the necessity and propriety of the works proposed, and the expediency of the state government undertaking them exclusively, it next becomes proper to inquire, what sum is necessary for their accomplishment, and can the state command it? Five millions of dollars, it will be seen, is the maximum sum required; and this, it is proposed, should be raised by loan, in sums not exceeding one million annually. These sums are fixed upon as being extremes, because the convention are not willing to practice any imposition upon themselves, the legislature or the people. They must necessarily speak in round numbers, and they choose such as were rather likely to be over than under the amount; that the public mind, at the same time that it was called upon to contemplate the happy fruits of their proposed undertakings, might fully understand the difficulties to be encountered, and the price to be paid. That the correctness of the computation may be tested, the basis is furnished upon which it is made.

35 miles of rail-road in the northern counties, at $8,000 per mile,	$280,000
150 miles of rail-road across the state,	1,200,000
365 do. do. from east to west,	2,920,000
Ship channel from Newbern to Beaufort,	600,000
	$5,000,000

The rate of cost per mile, for the first three items, is supposed to be excessive, and is founded upon the comparison of the rates of similar works in other states, although it is believed that in this state the rate would be less than in any other: while it is further supposed that by practice, experience, and the improvements for which the present day is so remarkable, the rate of cost of rail-roads per mile is in a regular course of diminution. These items, however, must at last depend upon the surveys, reports and computations of experienced engineers. The convention believes that, upon the whole, their computation will be found to be sufficiently liberal to cover the actual cost. They can only say, that it is their wish to be correct, and they have taken some pains that they may be so.

You will next inquire, can the money be borrowed, and upon what terms? We are informed that in the city of London alone, fifty millions are waiting the demands of a borrower, to say nothing of the other portions of Europe, and the surplus capital of our own wealthy cities. As to the rate of loan, the committee, in their report, have undertaken to say that it may probable be obtained at four per cent. and can, in no event, exceed five, if proper measures are adopted to provide for the regular payment of the interest. But can this be done?

The convention feels certain that the legislature can and would do so by a proper system of taxation, should any accident create the exigency—a measuse in which they would not only be fully sustained, but which would be imperiously called for by that high sense of justice which has ever characterized us as a people, and forced unwilling plaudits from those by whom we are least admired—a measure to sustain which, should it become necessary, each member of this convention doth hereby pledge his sacred honor. But it is hoped and believed that it will not be necessary. The schedule annexed to the report of the committee, shows in addition to uncertain items and the swamp lands, an aggregate available fund of 1,067,000 dollars, whi h it is advised should be set apart as a partial security to the proposed creditors of the state. This, by further reference to the report, it will be seen, in connexion with some certain annual items, will yield, without infringing upon the principal, a sum more than sufficient to defray the annual interest upon the first million borrowed. That million, if judiciously expended, would probably, by the time the second million should be borrowed, yield an income which, if not sufficient of itself, would, with the surplus of the annual product of the original fund, pay the amount of interest upon such second loan, and so on, *toties quoties*, as the loan might be required. But even if a less happy result should take place, and it should be necessary to make some small encroachment upon the principal of the original fund, it would take seven years and nearly one-half to exhaust the fund now on hand, in the payment of interest, by borrowing one million annually, for five years, although no actual income should be drawn from any part of the works; and, in that time, if the money was not most stupidly expended, would not the gradual increase of the value of property along the lines afford a capital for taxaton sufficient to discharge the debt? That increase on the route of the New York canal, is said to be $90.000,000, and on the South Carolina rail-road, a sum sufficient to defray the whole cost of its construction. So that the convention may confidently predict that the sum proposed may be safely borrowed at the proposed intervals, without

the smallest fear of its being onerously felt by any citizen.

The repayment of the loan, the convention conceives, may be postponed to a very distant period, as it seems that money lenders, where they are satisfied with the investments, make their terms more favorable in proportion to the length of time for which the payment is deferred.

The convention would not recommend to the legislature to borrow a large sum of money to spend in idle and unprofitable experiments; but it may not be improper to remark, that even if the works proposed should be entirely unproductive, the introduction of five millions of capital, to be spent within the state, could not be considered as a certain loss, and would not be altogether without advantage. And this brings to our notice another reason why the proposed loan should be preferred to drawing the money from the pockets of the citizens, either in the way of present taxation or subscriptions to stock companies. There is in North Carolina a scarcity of circulating medium, and it is, we believe, a subject of complaint before your honorable body at its present session. Is it, then, the part of sound policy to make further exactions from those who are already oppressed, or, by availing itself of the present occasion for its useful and safe application, by the introduction of a large circulating medium into the state, entirely to relieve the evils complained of?

Nor will the effect be temporary. It is not like chartering a bank, which issues its notes, and thereby creates a present abundance, to be followed by a correspondent famine, when it shall call them in; but the amount under consideration is added to the permanent wealth of the state. It is funded in a perennial stock, which not only remunerates the holder by a regular payment of interest, but also by a vast increase of the value of the real property of the state, and furnishing the materials for productive labor.

The stimulating effect which is wrought upon every species of industry, by the introduction of such great quantities of circulating medium into the country, would scarcely be less than magical. The price of labor would be wonderfully increased in the vicinity of any branch of the proposed works; lands would rise rapidly in value; and then ready markets would be found for large amounts of the more important articles of produce, as well as the smaller matters, which are the peculiar objects of female care and industry. Nor would this effect be confined to the immediate vicinity. Like the successively wide and wider circles which the falling pebble causes in the agitated stream, the impulse would be communicated from neighborhood to neighborhood, until its vibrations would be felt in every corner of the state.

The deferred payment of the debt has been, by some, objected to, as an unjust imposition upon the succeeding generation. But who, it may be inquired, is to partake most largely of the benefit of the outlay? Surely the legatee to whom a rich inheritance is bequeathed, can have no just reason to complain that a mortgage is upon it for a tenth of its value. All that posterity can demand of us, and that it may well demand, is, that we should fairly improve the family inheritance; and it is not unreasonably that the inheritance itself should pay the expenses of the improvements.

The convention are perfectly aware how much all men are creatures of habit, and that there is a startling association with infinity when they first begin to speak of millions; but there is a happy elasticity in the mind which enables it gradually to expand to the full and easy reception of the most extensive ideas. Let the people become acquainted with the vast advantages which an extensive system of internal improvement holds out to them, and the millions which it will take to produce these advantages, will soon become familiar to their ears as household words. It is this capacity in the mind, together with its tendency to stretch itself to the full extent of the magnificent objects by which it is surrounded, upon which we found a strong argument in favor of our system. Its natural effect will be to set before the people the highest standards of arts, science, and moral refinement, and they will instinctively elevate themselves to their enviable level.

The convention would respectfully suggest to the legislature that, in taking up this interesting subject, they should adopt the prudent course which both the committee and this convention have found it necessary to pursue, and, while you adopt the general outlines of the plan, leave its details to be settled by an independent and disinterested board, to be raised by yourselves, under the light and instruction of proper engineers. The reason for this course cannot fail to strike a body so intelligent as that which we address, and we will not weary your patience by pressing them upon you.

Gentlemen, we trust that your honorable body will act up to the crisis at which you have arrived; in fearless independence and noble liberality, meet the people half way in the generous spirit with which they approach you; seize the occason which now presents itself, to associate your names with one of the brightest eras in the history of your native state; and when, in future years, your sons shall point to the strong foundations of their country's wealth and glory, let them say, while their bosoms swell with filial pride, my father was one of that enlightened and independent legislature, by whom they were laid. The convention does not profess to be so far the agents of the people as to be able to act efficiently; but they may be well supposed to imbody the wishes and opinions of a majority of the state, at least as great as forty-four is to twenty. With this claim to the attention of the legislature, and pleading a cause which might well rely upon its intrinsic worth and deep importance for full investigation, this convention, in behalf of the thousands of our citizens of the present day, of all sexes, ages and conditions, and the countless millions of unborn generations, and appealing to all the best principles and affections of your hearts, your sterling patriotism, your filial reverence, your fraternal regard, your conjugal tenderness, and, above all, your parental love, with manly confidence, presents its memorial. That the God of our fathers may so direct your deliberations, as that they may be crowned with the most lasting and extensive benefits to your constituents, and the most unfading honor to yourselves, this convention, as in duty bound, will ever pray.

DAVID L. SWAIN, *President.*

Read and signed by all the members of the convention who voted in the affirmative.

JA. COOK, } *Secretaries.*
E. L. WINSLOW, }

December 24th, 1833.

To the Editor of the Farmers' Register.

The newspaper which will be sent with this letter was published on the first day of the last November meeting of our agricultural society in Fredericksburg. It was handed to me at a friend's house where several of us were dining, and the "*Extract from Old Virginia Georgics*," was deemed a picture at once so true and so amusing, that I proposed to read it at our evening meeting as a communication to our society. This proposal was carried by a unanimous vote, and executed accordingly.

If it entertains you half as much as it did us, I think you will probably deem it worthy of a place in your Register, by way of variety; which must be consulted in some degree, even in an agricultural paper. J. M. G.

From the Virginia Herald of Fredericksburg.

Mr. Editor,—As the period is at hand when the society formed to improve the agricultural operations of the farmers in eastern Virginia, is to convene in your town; being one of that honorable fraternity I send you the following fragment, and hope you will lay it before that respectable body, as it will throw some light on the system of husbandry pursued in that part of the country which is now, and for many years has been, the laudable object of their labors—and as it will exhibit many of the most prominent diseases under which the system languishes, the hope is indulged, that suitable remedies may be devised and recommended by the society at its approaching session. The fragment is the introductory part of a poem written some time ago by a friend of mine, and I regret exceedingly that the remainder is lost, as it was continued to four books, and was designed to describe the various occupations on a farm in winter, spring, summer and autumn. I consider the loss irreparable, especially at a time when so noble a plan is on foot as that of making good farmers.

PREMIUMS.

Extract from a Poem entitled Old Virginia Georgics.

"Quid faciat lætes segetes,
* * * *
* * * *
Hince canore incipiam."

ARGUMENT.

Virginia husbandry and that depicted by Virgil contrasted—ploughing—horses, and manner of driving—gear—mules—the ox—pastures—harrows—skimmers, &c.—crab grass—shepherds—sheep—rogues—runaways—wolves—hounds—milk—milk maids—fence rails—watlings—invocation—address to arators—shallow ploughing—clover—gypsum—cowtail—Sir Humphrey Davy—year begins—clodhoppers—overseers—hiring day—bonds—distribution of labor—grubbing—effects of leaving stumps—old fences—hogs, &c.

I sing the tillag- old Virginia knows,
Which cheats with hope the husbandman who sows;
Not such as Maro sung in deathless strains,
To piping shepherds and Italian swains.
With "*crops immense*,"* no "*barn here ever cracks;*"
The wheat comes always badly from the stacks,
The corn falls ever "*most immensely*" short
Of vague conjecture or of false report;
No *well fed bullocks* drag the glittering plough,
But half starved horses, and the Lord knows how!
Their shoulders chafed by hames of naked wood,
Till downward streams regardlessly the blood;
Urged on incessantly by thundering whips,
Of shouting negroes with their *haw's* and *geep's*:
No well fed bullocks—no, but stubborn mules
Well match'd in villainy with him who rules,
For as their sides resound, just heaven! with sticks
They oft let fly the most tremendous kicks;
Tho' Pompey punch them, and tho' Cæsar curse,
It serves no purpose but to make them worse.
Some Frenchman* said—"would you convince a fool,
As soon go kick in stable with your mule."
Sententious wit!—how forcible!—how true!
I daub the picture which at once he drew.
No well fed bullocks—but the bare boned ox,
That suff'ring martyr to inhuman knocks!
Condemned, tho' pining with the *hollow horn*,
T' exist on fodder, but to eat no corn.
Repast too scanty!—in the furrow flat
The suff'rer sinks—"*the creature was too fat*"†
No smiling pastures spread inviting here,
But dry hot fields on ev'ry side appear,
A sultry scene, a dismal waste, alas!
Where man's great object is to kill the grass.
This tho' attacked with never ending blows
From harrows, skimmers, and from clattering hoes,
Will rise abhorrent on the farmer's view,
Like fam'd monster which Alcides slew.
Crab grass deracinate, and turn your backs,
It starts like Hydra from repeated whacks.
No shepherds tune their reeds to idle rhyme,
For none have leisure for such waste of time;
In truth, the sheep by no one here are watch'd,
Save rogues, who suffer if they can be catch'd;
Hound—wolf—or runaway, he only deals
In closely dogging at their nimble heels.
Alas! poor flocks! Arcadia's pastoral ground,
Nor "*Thyme*," nor "*Cytisus*" can here be found;
"*Distended udders*,"‡ near approach the pail,
But only udders which are sure to fail.
Cows bagless—poor—protuberant in joints—
Yield milk in spoonfuls, or at most in pints.
What Melibœus, or what Tyterus too,
Could make rich cheese§ from milk of azure hue?
Drawn by Miss Blackamore at early morn,
From things so famished that they've turned to horn.
No "swallows‖ blossom on the neighboring hedge"—
We use but fence rails which are split by wedge,
Or watlings dry unsought by "*Hybla's bees*,"
Which can't suck honey from dead limbs of trees.
Oh muse!—but pshaw!—that's stale!—a joke—
What muse' I prythee, should I here invoke?
Those maids of Pindus, in this Christian land,
Should not be call'd on for a helping hand?
Ah! sooner call to aid the rustic lay,
Chiefs grown conspicuous in this farming day—
Who rule in clubs, and stately there preside,
And mount their hobbies for a tedious ride;
Who write long essays in a style confused,
Themselves more culpable than those abused.
Those sage Triptolemi who wield the pen,
To show our fathers were misguided men;
Far, far inferior to their wiser sons,
Mere Goths and Vandals! or like barb'rous Huns,
Whose sway brought ruin on the fairest plains,
These lacking mercy, and those lacking brains.
Come then Arators of the modern school,
And be benignant to a rhyming fool.

* Immensæ ruperunt horrea messes.—*Virg.*

* Montaigne I believe.

† The common excuse of the Buckskin for the death of an ox, occasioned by starvation.

‡ Bis venit ad mulctram, binos alit ubere fœtus.

§ Pinguis et ingratæ premeretur caseus urbi.

‖ Vicino ab limite sepas,
Hyblæis apibus florem depasta salicti.

Himself a farmer of that set i'fegs,
Who rip the goose to get the golden eggs;
That stupid, blind, short-sighted band,
Who skim the surface and undo the land:
Who rear no clover on a thirsty soil,
For why;—it grows not to reward their toil:
Who strew no gypsum, but absurdly rail,
And swear 'tis nothing to the old cowtail.
These are their follies—these their crying sins,
Despite the pamplet of the enthusiast Binns;
I own the charge and cry myself, peccavi:
I read, but follow not, Sir Humphrey Davy.

Arise clodhoppers! now begins the year,
Attend the business which now demands your care.
O'erseers all! whom Taylor dubs the "*Priests**
Of sad destruction," mount your bob-tail beasts,
Keep always fat when other nags are poor,
Tho' fed on nothing from the corn house floor†
'Tis hiring day—and to each county court,
Those who have negroes will this morn resort.
Bid, boldly bid and stretch your eager throats,
O'erbid your rivals, and then give your notes;
Fear not the consequence when months roll oe'r,
You've passed your bonds—so think of them no more;
When that is done, Virginians' debts are paid,
'Till courts of justice lend their tedious aid.
High minded men disdain these petty rubs,
They leave such settlements to legal scrubs:
Skinflints alone are ever punctual found,
And take their bonds in, at the time they're bound.
This done—return to your respective homes,
Prepare your corn fields ere the spring time comes.
Renew your several troops of sooty blacks,
Make *wenches* grub and *fellows* wield the axe.
Watch well the former, for they often leave
The stump, insidious, in the soil they cleave,
And when the plough, at some more distant day,
Incautious strikes—lo! every thing gives way:
Share, beam, and chanes—and eke the back-bands too,
And Sambo staggers as he utters whew!
Wield well the axe, and fell the growing trees,
Ope wide the cornfield to the cooling breeze.
Naught more contributes than the air, I ween,
To keep your cornstalks in a healthy green.
Go round your fences and adjust the rails,
Insert new pieces where the old one fails;
Stop all the hog holes, lest the treacherous snout
Should find these pass-ways to your corn field out.
Too many hope by aid of yelping dogs,
To guard the corn field from "*infernal hogs*,"
They leave their fences in a state unsound,
Then comes the hog and *grunts* them to the ground;
They plant—rest from their labors—sleep—
These curst marauders through the hog-holes creep;
Led on, perhaps, by some gigantic boar,
What havoc spread they while the laborers snore.
The morning breaks—what work for them that morn!
The hogs!—the hogs!—the hogs are in the corn! !‡
Ah! then and there are hurrying one and all,
Like Byron's picture of the Brussell's ball.§
Men, dogs, and hogs, in one confused pell mell,
And many a dismal squeal, and many a deafening yell!
Some dog soon fastens on some luckless ear,
A while hangs growling, then lets go with fear;
Anon he seizes on his mangled prey.
The Perthian wheels and fights, and flies away.
Hold him! and hold him! makes the welkin ring,
While round his head the rocks and brickbats sing.
At length the battle ends—the routed swine
Have reach'd the Rubicon, the neighb'ring-line.
Away they go with many a joyous snort,
The master curses, but 'tis Sambo's sport.
Oh dreadful scenes! renewed perhaps next day,
"*Quorum pars fui*," as every one may say.

* * * * *

* * * Hiatus maxime deflendus.

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* Taylor's Arator.

† An assertion always made, but somewhat apocryphal.

‡ The hogs are in the corn field! tus em boy, tus em boy,
The hogs are in the corn field! tus em boy, ho!
Here we find the origin of the above popular song in Virginia.

§ Ah then and there was hurrying to and fro,
And gath'ring tears and tremblings of distress.—*Byron*.

SOILS AND FARMING OF FAIRFAX COUNTY.

To the Editor of the Farmers' Register.

Fairfax County, Dec. 28th, 1833.

As you invite your subcribers in the different counties to make agricultural reports, I shall make you the best I can for this county, though I cannot promise myself or your readers much satisfaction. Nature has given us three very distinct kinds of soil in this county, and those again have their various aspects and constitutions quite as distinctly marked as the people who live upon them. First, the river land, which I will, for general purposes, limit by the great southern mail road from Alexandria to Colchester; the most of this was originally good land, but being very flat and wet, has been destroyed by careless unskilful cultivation. Ditching and good cultivation, (such as Mr. Selden's,) would soon restore it. The last crop of corn was very short, and the wetness of the winter will doubtlessly be fatal to the crop of wheat now in the ground. By referring to the map, you will find the Mount Vernon estate, and that of Gunston, the property of the late George Mason Esq: they border for many miles upon the river, and have many and valuable fisheries upon them, the offal of which would have made much land rich had it been judiciously used; but it is a melancholy fact that little use has been made of that valuable material for improving land. Some efforts have been made upon the river to reclaim extensive pocosins; they did not result so beneficially as could have been wished. Twenty years ago most of the good wet land in this district was devoted to the production of grass, and was very profitable: but we have had no profit from them since 1815; then they were worth thirty dollars per acre per annum. An estate has lately been sold in this district for twenty six dollars per acre, but I believe it would require a great salesman to sell another at the same price. Plaster has been used by some for more than thirty years with success. Any, curious to mark the operation of time upon human affairs, would find much for contemplation by riding through the extensive domains of the late General Washington. A more wide spread and perfect agricultural ruin could not be imagined; yet the monuments of the great mind that once ruled, are seen throughout. The ruins of capacious barns, and long extended hedges, seem proudly to boast that there master looked to the future. It is strange that the cause of the absolute death of so large an estate was never seen by this great and discriminating man; and yet more strange, that out of many managers, of this country and of Europe, none, by their correctives, appear to have seen the cause; had they seen that it came to its death *by drowning*, prompt restoratives would have been resorted to, we may presume: they would have freed the land from water, placed it in warm dry beds, and then by friction and stimulants, a full and perfect restoration would have been the result. I assume that the attending nurse would give the patient all the food that his means would supply.

Deep ploughing is singularly unskilful and ruinous upon wet land: it reminds me of the practice of certain calomel doctors, who seek to restore their patient by scraping his backbone, and taking out his teeth: he is left in the worst of conditions—dead without being conscious of it.

The next belt of land I would extend to the red sand, or slate. It is fourteen or sixteen miles wide, was not originally poor, and it may be restored by good ploughing, clover and plaster. It is very dry, and well watered, and the experiments of the late W. H. Fitzhugh prove that it is good sheep pasture. Upon the Little River Turnpike, industry shews that the land is susceptible of high improvement. The upper, or red sandstone, and slate portion of this county, is destined to be very valuable: the calomel doctors may here give stimulants to his patient by scraping his backbone, and stuffing him with clover. One evil practice will long keep in check the developments which time must make in this district: it is that of close feeding their clover. Time will correct this—when their products will rival the limestone and mountain country. Finally sir, looking at the county as it was thirty-six years ago, and at the present time, I must say that hope and hope only, keeps two thirds of the population of this county in it. Like the Jews, they look for something supernatural—they look for that which is not the stores of time.

F.

THRASHING MACHINES—ALBEMARLE AGRICULTURAL SOCIETY.

To the Editor of the Farmers' Register.

Albemarle, December 23*rd*, 1833.

It has occurred to me, that some desirable information (at least, to a portion of your subscribers,) might be obtained through the Farmers' Register on the subject of any late and important improvements which may have been made in the construction of wheat thrashing machines, and to ascertain which of the various plans or models now in use in Virginia, are most approved by practical farmers. Whether these machines, which operate with beaters, or those with cilinders and pins, are the most perfect, is the object desired to be obtained. If some of your numerous subscribers and correspondents, who have had an opportunity of testing the value of the several machines now in use, would be so obliging as to give the public the result of their experience, I have no doubt, that the information would be thankfully received. You can, if you think proper, make such request in the manner most agreeable to you.

You, no doubt, are apprised of the existence of an agricultural society in Albemarle. It was first established in 1818. Its first president was James Madison. The present number of regular members exceed one hundred—the adjacent counties furnishing a small portion of that number. For the last nine years, we have had an annual show and fair, for the exhibition of live stock, domestic manufactures, agricultural products, &c. The premiums awarded, have not been of large amount, but quite liberal for the funds of the society, and sufficient to produce considerable competition. I think it very evident, that the influence exerted through the society, has been productive of a great and visible change in the general improvement of our lands, and consequently in their various products,—as also in the improvement of our stock of domestic animals of all classes. The encouragement, and emulation given to our household manufactures of various kinds, have also produced beneficial results. It may be proper to remark, that those improvements of which I have spoken, are not exclusively confined to members of our society, but exist in the practice of many others. The stimulus given by example, of succeesful good management, in all the various operations connected with agriculture, has been greatly diffused throughout a large portion of our county. We could point to some of the members of our society, who deserve to be considered as among the most successful and distinguished farmers in the state. I trust we shall not relax in our zeal and exertions to accomplish the laudable design in view, until we have attained at least something worthy of good citizens, and benefactors to our country.

From what I have premised, I think you cannot too earnestly recommend the establishment of county agricultural societies, throughout the commonwealth. There are very few portions, if any of the state, but have the materials necessary to constitute such societies and objects sufficiently numerous and important to employ their attention. The extensive circulation of your valuable Register, I consider highly encouraging, as affording the evidence of an increased spirit for the agricultural improvement of the country. The Register will act as an auxiliary in promoting the establishment of county societies; and in return, they would be the means of affording it a still more extended circulation.

W.

CORN CULTURE ON WEYANOKE.

To the Editor of the Farmers' Register.

Weyanoke, December 31*st*, 1833.

Your letter long since written, I have unpardonably neglected to answer until this time, for which piece of inattention, I beg you to excuse me. Since my return home, it has not been in my power to give the required answers in relation to my mode of cultivating corn, but I now avail myself of a leisure hour to do so.

The soil of Weyanoke, you rocollect is a sandy loam; an attention to which circumstance will supersede the necessity of explaning more particularly, some of the reasons for my system of cultivation.

The land is ploughed with the bar share, before planting and harrowed where necessary. Part of it is flushed; but the part designed for manure is laid off in parallels of 5½ feet, by furrows which are cleared out with a bar share going up and down. The manure is then spread upon the surface and the ground thrown into ridges, which are so formed, that the top of each ridge, is immediately over the corresponding furrow made in the first instance. By this means, the manure is buried pretty deep, and accumulated under the ridges where the corn is to be deposited. In the course of the subsequent operations, however, it is desirable on my soil to reduce these ridges, as nearly to a level as possible, on account of the ensueing crops of wheat and clover.

A suitable time is taken for spreading the manure, and covering it with the least possible delay. The course manure, made in farm pens, &c. is all previously mixed in large ricks, and well incorpo-

rated, while in a moist state, with the stable manure, in the proportion of two loads of the former, to one of the latter. The whole mass undergoes a rapid fermentation; and is in the state of coarse muck, when spread upon the surface. It is proper to observe, however, that these ricks are made in places convenient to the ground, where the dung is to be used; and therefore, they are sometimes at a considerable distance from the stables, though generally near to the large farm pens. The corn on the ridges is planted at intervals of four feet; having two stalks in the hill. That on the flushed ground is planted likewise in rows of five and a half feet by four feet in all the improved land. Where the soil is less productive, the corn is planted five and a half feet by three feet three inches, and only one stalk left in a hill. In planting on the ridges, I adopt Colonel Taylor's mode of using the string or cord; the ridges being first lightly harrowed, for the purposes of levelling them, and opened with a furrow. Immediately after planting, ploughing is commenced the wide way, with double shovels and X ploughs, (principally the latter,) on all the unmanured land; while upon the manured part, skimmers are used which are not apt to bring up the dung to the surface. This operation is repeated, and in the same direction, if the corn comes up slowly, or is backward in growing. So soon as it attatains the height of five or six inches, (I say nothing of the time of thinning, as this depends upon circumstances,) we use the double shovels the narrow way, twice in a row. From experience, I have found great advantage in ploughing very near the corn in this stage of its growth, and have been materially benefited by adopting a plan recommended to me several years ago, by my son-in law, Thomas Marshall, Esq. Each ploughman is attended by a little boy, who is furnished with an implement which, for want of a better name, is termed a *paddle*. It is a light stick about four feet long, with a board like a semi-circular piece of barrel-heading, nailed at one end. The boy goes along with the ploughman, a little in advance, the corn row between them; he interposes the paddle between the plough and each plant successively, precisely at the moment that the plough reaches the plant, and thus prevents it from being covered with the loose earth.

By this contrivance, the plough can be made to pass much nearer to the corn, than it could possibly do otherwise: the step or intervening space, is completely covered with loose earth which smothers the grass; the plants are gently stirred; and the whole field is as well worked, as if the hoes and ploughs had both been used. The deeper the bloughing the better.

The next operation is to plough the wide way with the X ploughs, running twice in a row. These implements are valuable for superficial work, and will go over five acres each per diem. I do not know by whom they were invented, but I have not failed to use them for the last five years.

The corn is never ploughed a second time the narrow way, but we continue to use the X plough as often as the season and the state of the ground will permit. If the field becomes hard, or grassy, we are compelled to use the shovel plough.

Immediately after the use of the ploughs and paddles as above mentioned, we begin to hoe the surface, at the same time that we use the X ploughs, and in the same direction; giving a small hill to every plant. Any grass out of the step, not cut up by the ploughs, is also removed by the hoes.

I know nothing else worthy of communication, except, that the grain intended for planting is soaked in hot water the previous night, spread in the morning upon a large table, mixed well by hand, with tar and train oil, and afterwards rolled in lime with a little sulphur. This I have found to be an effectual guard against the depredations of the crows; the black birds seem to disregard it.

FIELDING LEWIS.

Paddling Corn.

[Believing that it might be useful to give a more particular explanation of a novel process in the tillage of corn, which Mr. Lewis describes in the foregoing communication, we requested it of Mr. Marshall, and obtained the following answer.]

To the Editor of the Farmers' Register.

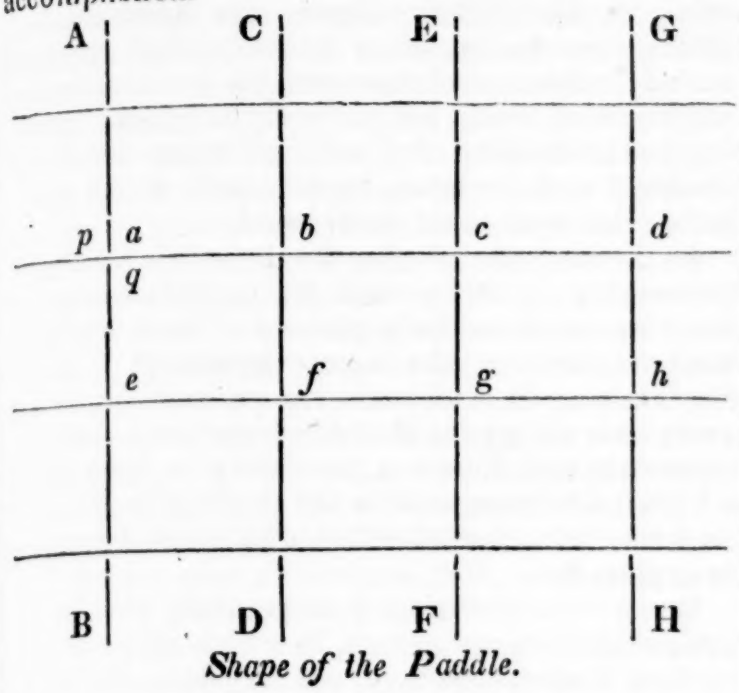
I take pleasure in complying with your request, that I would add some explanatory remarks to an allusion understood to have been made by Mr. Lewis, in reference to a particular process in the cultivation of corn, which was originally suggested by me.

The very name of *paddling* imports something ludicrous; and I would hardly have ventured to make an original communication about it, myself; but any person who has witnessed the successful cultivation of Mr. Lewis, will not be inclined to disregard, as trivial, any practice which he deems worthy of imitation.

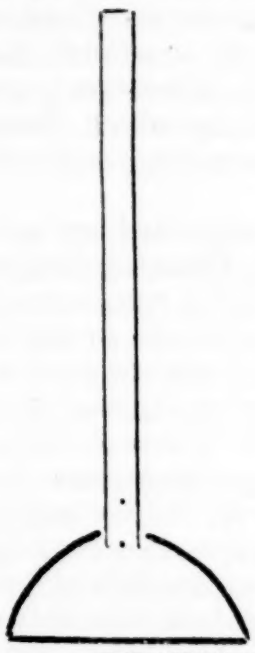
In the annexed diagrum, supposed the parallels A B, C D, E F, G H, to represent a portion of the wide rows, and the trasverse parallels, A G, *a d*, *e h*, B H, to represent the corresponding portion of narrow rows in the corn field.

Let us take the row *a d*, for an example, in which the points of intersection, *a*, *b*, *c*, *d*, show the corn hills. The ploughman commences at *p*, with the intention of moving towards *d*; the plough being inserted near *a*. The boy, who accompanies him standing on the other side of the corn row, at *q*, interposes the paddle between the plough and the plants at *a*, in an oblique direction. As the plough moves, he makes such a change in the position of the paddle, as to allow the loose earth to fall around one-half of the hill without covering the plants. By the time the plough reaches *b*, the paddle is again interposed in an oblique direction, and a similar twist given to it while the plough passes the hill. The paddle having performed its office, is transferred to *c*, and afterwards to *d*. In returning, the ploughman and boy, change positions in the rows; the boy being always on the right hand. The other side of the row, is then worked in like manner, from *d* to *a*. When properly done, each plant is gently stirred without being displaced, and surrounded with loose earth. The plough goes so near, that every hill in succession would be covered with earth, but for the timely interposition of the paddle. The work is done rapidly; so much so, that the additional labor of the boy, is in fact, a great saving. Without the aid of the boy, the ploughman must either proceed very slowly, or else take care to keep at a distance, that the plants may not be covered; in which case the work is imperfectly done. A person who would examine a field that had been worked in this way, without having seen the process, would find it difficult to

conjecture how such efficient ploughing had been accomplished.



Shape of the Paddle.



THOMAS MARSHALL.

Richmond, January 23rd, 1834.

RAPPAHANNOCK LANDS, AND MARL BEDS.

To the Editor of the Farmers Register.

One of your subscribers, who is a very young farmer, flatters himself that he is desirous to learn from every available source, the art and mystery of cultivating the soil properly, and this desire and your invitation to all, however plain in speech, to aid you in your noble and philanthropic undertaking, has induced him to address you.

I reside in that part of Virginia, which we term the Rappahannock valley, a district lying immediately on the Rappahannock river, comprising with few exceptions, rich flat land, far better adapted to the growth of corn, than of wheat. I have no doubt, that from ten to twenty feet below the surface this entire district rests on a thick and inexhaustible stratum of marl; and believe, that this stratum is continued from river to river, as far as the limestone region. Wherever the banks of our rivers are high, and *breaks* are met with in the land (openings for springs to the river,) fine shell marl is found, and frequently without being searched for. I have it in great abundance along the bank of the river, from one end of my farm to the other; and wherever there are breaks in the land, the strata of marl, send off branches as it were, which follow the breaks on each side, till the latter disappear.

I am sorry to confess to you, that this fine marl, in many places so convenient, has been very little used. Indeed, I know of but three farmers, within the distance of twenty miles above and below me, that have ever carried it on their lands. As far as it was used in these instances, it had a highly beneficial effect. I am making preparations to begin marling in the spring—to procure the marl, from one spot, where it is convenient to a large body of land, in the least expensive manner possible, is an object of inquiry with me. This marl bank is directly on the river, and is about eight feet below the surface, and ten above high water mark. The bank of the river here is perpendicular; so that it would be extremely difficult to make a tolerable road to it. My idea is that a capstan worked by one or two oxen, would draw up in a day, as much as two or three carts could carry out. I would have a car with its wheels running on a railway, attached to the rope of the capstan. Could the *crane* be used with more advantage?

I shall commence this year, the operation of marling, and continue it till I marl every acre of my arable land, though to do it, a few laborers must be hired, for I have not more than sufficient to work my land.

I have been informed by a person who has tried it, that marl exhibits its effects on one crop, the first year that it is applied—this crop is cotton. From the description received the size of the stalk of cotton was increasen two-fold. I account for this on the supposition, that the decomposition of the marl produced some degree of warmth, which would in this climate be very beneficial to cotton.

The upper stratum of one of my marl banks is composed of marl, which feels soapy, when rubbed between the fingers, and in which the impression of a shell is seen. When thrown into strong vinegar, the carbonic acid escapes with a sensible effervescence. The lower stratum contains a great deal of shell. I cannot account for the absence of shell in one case, and its presence in the other—to what cause is its disappearance in the upper stratum, attributable?

We do not fallow for wheat on the Rappahannock—indeed we do not consider ours a wheat country. I have known as many barrels of corn obtained from one shift, as bushels of wheat. The system generally pursued is the three shift—a system, which I am convinced can never improve the soil, unless marl or standing pastures be used. I am the only farmer in my neighborhood, who pursues the four shift system, and I am about to prepare a piece of meadow and highland adjacent, for a standing pasture, intending never to graze my lands, except for a short time after harvest.

I have no doubt that when we have made our lands stiffer by marling, they will be much better for wheat, and that we shall find it to our advantage to fallow for this crop. I hope that a spirit of agriculteral improvement is spreading through the old dominion, and that, when a few have rendered their soils highly productive by marl, their example will be generally followed. And you, Mr. Editor, have the enviable lot of reflecting, that you are in a great measure, instrumental to this spirit—"he who makes two blades of grass grow, where one grew before, says a political economist, is a benefactor to his race." That you may

succeed in arousing in our beloved state, a just estimate of agriculture, and in stimulating its farmers to improve their lands, is the wish of one of your warmest admirers. H.

[The situation of the marl described by H. presents but small obstruction to its use. A good road with a gentle ascent may be easily cut, (as directed in the Essay on Calcareous Manures,) and it will be then found that a horse and cart will be better and cheaper means to raise the manure, than either crane or capstain. When H. applies his marl (to suitable soils,) he will also find that it is not only cotton, but that every crop will be benefited, and in a high degree, within the first year of the application.]

To the Editor of the Farmers' Register.

Sir,—As I perceive you have published in your number for October, Baron Varnhagen's notice of Sir John Sinclair which I formerly transmitted; I now send you a paper recently received, in which Sir John suggests some excellent ideas on the subject of malaria, which cannot fail to be interesting to Eastern Virginians. G. W. F.

Washington, January 4, 1834.

HINTS ON THE MEANS OF PREVENTING THE MISCHIEVOUS EFFECTS OF "THE ROMAN MALARIA;" AND ON THE IMPROVEMENT OF MARSHY DISTRICTS IN GENERAL, WITH A VIEW TO THE PREVENTION OF THE DISEASES WHICH THEY ARE APT TO PRODUCE.

*By the Right Hon. Sir John Sinclair, Bart. Author of the Codes of Health and Agriculture.**

The malaria seems to be an invisible and diffusible vapor, generated apparently under certain circumstances of heat and moisture, in stagnant waters, and in damp soils, particularly when accompanied with rank vegetation. Diseases thence arise, which form the peculiar scourge of hot climates, and of cold climates in the hot seasons of the year.†

It is well known, that marshy districts are peculiarly unhealthy. It appears indeed, from tables drawn up by M. Maret, of several parishes in Switzerland, in which a comparison is made between mountainous and marshy counties, that one-half of all born in a mountainous district, live to the age of 47; whereas, the same proportion, in a marshy parish, live only to the age of 25. In the hills, one in twenty of all that are born live to 80; in the marshy parish, only one in fifty-two.‡

The miserable consequences resulting from aguish complaints, prior to a country being drained and improved, have been ably depicted, in that valuable repository of useful knowledge. "The Statistical Account of Scotland." In some districts in that country, a certain number of the inhabitants are said annually to have fallen victims to the ague. In others, the distemper was so frequent, that it was with difficulty the farmers could carry on their work, more especially in spring, when the aid of their laborers was most needed. Hence, in some parishes liable to that grievous malady, when any farmer wanted four laborers for any piece of work, he generally hired six, knowing the probability that some of them would be rendered unfit for labor, by an attack of the ague, before the work could be finished.

In the summer months, the malaria is peculiarly destructive in Rome and its neighborhood. It commences about the beginning of June, and does not terminate till the severe autumnal rains in September. It unfortunately encroaches, every year, on some part of Rome, where it was formerly unknown; and there is a peculiarity in the lines in which it advances, and in the mode of its progress which hitherto the inhabitants have not been able to explain.*

Being convinced that it is possible, chiefly by agricultural improvements, in which so many important discoveries have recently been made, to have this great source of human misery subdued, I have been led, to submit the following hints to the reader's consideration; and in particular to suggest a plan, by which the malaria would most probably be completely extirpated in the Roman territory.

The improvements I am led to suggest are the following:—1. Draining the land;—2. Cultivating it;—3. Employing calcareous manures;—4. Embanking land apt to be overflowed;—5. Procuring wholesome water for the drink of the inhabitants;—6. Preventing the noxious air generated in thick woods; and, 7. Warm clothing.

1. *Draining.*—It appears from the unquestionable authority of the Statistical Account of Scotland, that wherever the land has been thoroughly drained, intermitting fevers have disappeared.

There are no less than thirty parishes in Scotland, to which this observation is applicable; but in a condensed work like the present, it may be sufficient to give the following instance from a parish in the county of Fife. Before the land in that parish was drained, the families who lived near a piece of stagnant water in it, were subject, both in the spring and in the end of autumn, to intermitting fevers, of from 23 to 33 and sometimes to 39 days, continuance. Whole families were to be seen at the same time, in such distress, that none of them could assist the others, and depending on the kind aid of their neighbors for the supply of their necessities. But since the stagnant waters have been completely drained, those diseases to which the inhabitants were formerly liable, and the sad train of complaints connected with them, have happily been unknown. It is not easy, we are told, to describe the pleasure of viewing luxuriant crops, adorning the place where the eye had been accustomed to see stagnant water, and where noxious vapors, impregnated with disease and death, were formerly so usual.†

2. *Cultivation.*—But cultivation is the great means, by which this miasm can be most effectually got rid of, and the salubrity of the air permanently ameliorated. This important circumstance can be accounted for on rational principles.

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* It is not probable, that the most effectual means of mitigating the sources of these noxious disorders should have occurred to any one, who had not directed his attention *both to agriculture and to medicine*.

† See a valuable paper on the Malaria. Edinburgh Review, vol. xxxvi. p. 536.

‡ In regard to marshy situations in general, Dr. Price has written a short essay, containing proofs of their insalubrity, and confirming a paper by Dr. Priestley, on the noxious effects of stagnant water.

* Edinburgh Review, vol. xxxvi. p. 352.

† Statistical Account of Scotland. Parish of Leuchars, vol. 18, p. 586.

When land is deepened and pulverized, and improved by means of lime and other manures, it absorbs the rain more quickly, and in greater abundance than in its uncultivated state. Hence less moisture will arise in evaporation.

Increased vegetation also, diminished evaporation, for water is absorbed in considerable quantities by the plants themselves; and in proportion to their luxuriance, they not only diminish the reflection of the sun's rays, but keep the air cooler and more temperate, during the heats of summer and autumn. A much greater quantity of water also, is discharged into the atmosphere, by spouty land, producing aquatic herbs, and coarse herbage, than where plants of a finer quality are grown; and it is a most curious and important circumstance, that while the air immediately above a wet soil, was only 57° of Farhenheit, the temperature of the dry part of the same field, and of a similar soil, was considerably higher.*

It is likewise well known, that water contains both *pure air*, which is essential for the human species, and *inflammable air*, which is of such importance as the food of plants. By increasing vegetation therefore, that inflammable air, which is injurious to animals, is absorbed in greater quantities, while much more pure or vital air is produced.

The cultivation of the ground, is thus of essential importance, in regard to this important particular, for it contributes, not only to put an end to the malaria which is the cause of agues, and other febrile diseases, but produces a state of the atmosphere, which is favorable to the promotion of health.

In commencing the cultivation of marshy land, it is an excellent plan, to get rid of the surface of the soil, either by paring ploughs, or by hand instruments invented for that special purpose, *and to burn it.* If the ashes were then spread on the ground, a crop of wholesome vegetables might be raised, which would probably derive some nourishment from those very exhalations, if any should arise, which, though hostile to animal, are favorable to vegetable life, It is astonishing, that so simple a process as that of paring and burning the surface, so well known in various parts of these kingdoms, and the efficacy of which can hardly be questioned, should never have occurred, either to those who reside in districts subject to the malaria, where it might be employed with advantage; or to any of the natives of this country, who have visited every part of Italy in the course of their travels.

3. *Calcareous Manures.*—In marshy soils, the use of calcareous manures is of *the highest importance* and could be procured without much expense, as lime can be found, in the Roman territory, in the neighborhood of those very marshes, and coal could easily be got by sea to burn it, if a sufficient quantity of wood or turf could not be obtained for that purpose. The effect of burnt lime-stone, in improving the quality of the soil, is hardly to be credited. It either absorbs any noxious matter, or annihilates any deleterious properties it possesses; and it may be relied upon as an established fact, *"That a soil full of calcareous matter, never produces an unwholesome atmosphere.*

* See the experiment mentioned in the Middlesex Report, p. 288.

4. *Embankments.*—Much flat and rich land is apt to be overflown during the rainy season of the year, which at other periods are perfectly dry; and such land, when loaded with moisture, must necessarily be favorable to the production of miasma. The only mode of preventing such a calamity is, by means of embankments, then bringing the land under cultivation, and manuring it abundantly with calcareous matter. For getting off the water, where embankments are not found to be a sufficient protection, mills may be necessary, in particular windmill-pumps, which are in perpetual motion, without requiring much attendance.

5. *Wholesome Water.*—The preservation of health may be promoted in marshy districts, by procuring wholesome water to drink. This is an object however, to which little attention is in general paid in marshy districts, from the supposed impracticability of obtaining good water. Any difficulty of that description however, is now completely obviated, by the improved modes of digging wells practised in England, in consequence of which, water may any where be procured in the greatest perfection, and at a moderate expense. Of the important effects resulting from the use of good water, there is a celebrated instance in the parish of Steeple in Essex. A well was dug about 500 feet deep, by means of which, excellent water was procured; and by using it, the health of the inhabitants became so much improved, that they found little occasion for the skill of their apothecary, who previously to that discovery, had derived great emolument in consequence of the insalubrity of the neighborhood.* When once obtained, water may be sent to a considerable distance, in pipes, at a moderate expense.

6. Another mode of improving the atmosphere of a country is, by thinning the woods, where they are so close as to be impervious to atmospheric influence; and in particular, as a means of meliorating the air, all brush and underwood should be extripated. It can hardly be doubted, that every thing which retains too large a quality of unnecessary moisture on the surface, must be prejudicial to the inhabitants in its neighborhood; and this must be the case, where the woods are so thick, that both sunshine and wind are excluded. At the same time, the protection of groves where the trees are not too close to each other, and where the soil is dry, has been found of use.

7. *Clothing.*—Among the means by which the pernicious influence of a damp climate, and of a moist soil, is likely to be counteracted, the wearing of flannel next the skin has been particularly recommended. Various diseases are occasioned by obstructed perspiration *on the surface of the body*, and nothing but flannel will preserve this important discharge uniform, in a climate which is subjected to fogs and vapors, produced by water stagnating on the surface of the ground.† In a work published by an intelligent Italian author,

* An apothecary at Walden, in Essex, declared, that the inhabitants of that parish, after the well had been dug, and good water obtained, became so much improved in health, that instead of receiving from many farmers in the district, from 20*l.* to 30*l.* and even 40 a-year, he scarcely got, from his former patients, as many shillings *per annum*. See Code of Health, first edition, vol. ii. Appendix, p. 215.

† Statistical Account of Scotland, vol. xi. p. 234.

(Dr. G. Brocchi,) which has deservedly attracted the particular notice of the Edinburgh Review,* this branch of the subject is discussed; and it is there admitted, that to a certain degree, warm, and in particular woollen clothing, in short non-conducting coverings of any kind, are best fitted to resist the impressions of many diseases, and perhaps, in a degree, the malaria itself, by its effect on the predisposing causes.†

Thus it appears, that when a country is liable to malaria, it may be completely got rid of, or at least its mischievous effects materially diminished, chiefly "*by agricultural improvements.*" And this is not a mere theoretical assertion, for the advantages of such measures have been proved, in the most satisfactory manner, by the experience of several marshy or fenny districts in England. Before they were properly drained, strangers hardly ever ventured to visit them, from the certainty of being subjected to the ague. The inhabitants themselves of these districts, were seldom exempted from that distressing complaint, and thence were distinguished by an emaciated and jaundiced look. But since the improvements which have been effected by agriculture, they have become as healthy as their neighbors. The same results may confidently be relied on, if the same means of improvement were introduced into Italy, or any other country similarly circumstanced; and it would soon be proved, that agriculture was not only the means of providing food, but might likewise effectually contribute to the healthiness of a country, and the security of its inhabitants from disease. Along our eastern coasts indeed, we are interested in the exemption of our neighbors in Holland from that disorder; for there is reason to believe, that a species of malaria is transported from that country, to the British shores, by the easterly winds, which, in part at least, is the circumstance that renders them so unhealthy.

These hints are earnestly recommended to the reader's attention; and indeed there is reason to hope, if the following plan were adopted, that the malaria may be greatly reduced in its violence, if not totally extirpated, in those countries which are unfortunately afflicted with that disorder. It must therefore be a darling object with every true philanthropist, anxious to promote the interest of his fellow men, that some experiments on a great scale should be set on foot, to ascertain the effects of the measures proposed, and above all, that their efficacy should be tried in the neighborhood of Rome, to prevent the prophecy from being accomplished, "That if the malaria is suffered progressively to increase, the time is not far distant, when the Eternal City shall be no more‡." For accomplishing so important an object, the following plan is submitted to the reader's consideration:

Plan of an Association, to be called "the Society for the extripation of the Roman Malaria"

1. The Society shall consists of a President, four Vice Presidents, and twelve Directors, with an indefinite number of Members.

2. That the subscription shall only be £2 *per annum* from each member, but that donations, to any amount, shall be thankfully received from those who are anxious for the success of the plan.

3. That as soon as it can be effected, and if possible before the next season of the malaria commences, one or more intelligent engineers shall be sent to Rome, to examine into the state of that interesting part of Italy, to make maps or plans of all the territory in the neighborhood of Rome peculiarly subject to the malaria; and to ascertain the means, by which they can be most effectually drained, and brought into cultivation. To point out also, where other improvements should take place, as in regard to embankments, digging of wells, thinning of woods, &c.

4. That every inquiry shall be made, where lime-stone can be got in that part of Italy, and that the best means, of procuring fuel for the burning it into lime, shall be ascertained; for the introduction of immense quantities of calcareous matter into the soil, not only contributes to its improvement, but is the best means of preventing malaria.

5. That the persons employed for these purposes, shall draw up a plan, and estimate of the expense of carrying on the measures, most likely to prevent the malaria in future, and to establish the salubrity of the climate of that part of Italy; and that such a plan shall be carried into effect next year, as soon as the season will admit of it.

6. That as soon as the society shall be established, the whole plan shall be submitted to the consideration of the Roman government, and its aid and authority be requested, for accomplishing the same; and, in particular, the necessary powers for making, with as little delay as possible, those improvements, which are essential for exempting the city and territory of *Rome*, from the horrors of the malaria.

JOHN SINCLAIR.

133. *George Street, Edinburgh,* }
10th April, 1833. }

Description of "the Compagna di Roma," and on the means of promoting its improvement.

Since the paper on the subject of the Roman malaria was sent to the press, my attention was directed to an interesting work, entitled, "*Rome in the 19th Century,*" in three volumes octavo, printed in Edinburgh, 1820. It contains a series of letters, written during a residence at Rome, in the years 1817 and 1818, and is drawn up with so much ability, that the author need not have been apprehensive of prefixing his name. Indeed it was so popular a work, as to run through four editions. The information it contains on the subject of the malaria is highly interesting, and strongly in favor of making every possible exertion, to banish such a scourge from the most interesting part of Europe.

"That dreary solitude (the Campagna,) stretches about twenty miles in every direction, to the base of those hills by which the plain is surrounded. To the west, a wild sullen flat extends to the sea. A profusion of bushy thickets, and a few solitary trees, were scattered over the broken surface of this unenclosed and houseless plain,—for it is a plain,—since, at the distance of sixteen miles, where we now stood, we distinctly saw Rome. But it is not a dead flat, as many have asserted; on the contrary, it is generally undulating ground, interspersed with broken hillocks, and steep banks, covered with wild shrubby oak-wood, or lonely flat-topped pine-trees."

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* Vol. xxxvi. p. 536. † Ibid. p. 550.
‡ See Edinburgh Review, vol. xxxvi. p. 552.

"Over this wild waste, no rural dwelling, nor scattered hamlets, nor fields, nor gardens, such as usually mark the approach to a populous city, were to be seen. All was ruin; fallen monuments of Roman days,—grey towers of Gothic times,—abandoned habitations of modern years,—alone met the eye. No trace of man appeared, except in the lonely tomb, which told us he *had* been. Rome herself was all that we beheld. She stood alone in the wilderness, as in the world surrounded by a desert of her own creation,—a desert, which accords but two well with her former greatness, and her present decay. It may perhaps be soothing to the contemplation of the traveller, or the fancy of the poet, to see the once beautiful "*Campagna di Roma*," abandoned to the wild luxuriance of nature, and covered only with the defaced tombs of her tyrants, and the scarce visible remains of the villas of her senators; but it is melancholy to reason and humanity to behold, an immense tract of fertile land, in the immediate vicinity of one of the greatest cities in the world, pestilent with disease and death, and to know that, like a devouring grave, *it annually engulphs all of human kind that toil upon its surface.* The unfortunate laborers, employed in the scanty cultivation occasionally given to the soil, to enable it to produce pasturge for cattle, generally fall victims to the baneful climate. Amidst the fearful loneliness and stillness of this scene of desolation, as we advanced through the long dreary tract that divided us from Rome, a few wretched peasants, whose looks bespoke them victims of slow consuming disease occasionally remind us of the tremendous ravage of human life, which this invisible and mysterious power is annually making."

"I need scarcely add, that the season of the malaria is during the summer, and that, from the fall of the autumnal rains in October, till the return of the midsummer heats, the atmosphere is perfectly salubrious."

"Thus the Campagna seems to be the alternate region of life and death. Amidst all the ingenious, and practicable plans that have been proposed to stop the progress of this dreadful scourge the cause of it has never yet been satisfactorily explained; and till that be ascertained, it is obvious, that no remedy can be applied; if indeed it be within human control, which is a more presumptuous than probable conclusion."*

Description of Rome.

"My eyes dimmed with tears when I gazed for the first time on Rome, and saw before me, the great, the ancient, the eternal city—the acknowledged queen of nations—the mistress of the world the seat of glory, and the land of patriots, of poets, and of heroes.

"Other cities, however great or distinguished, are only the capitals of a country; but Rome is the metropolis of the world. Recollections dear to every human heart, in which every nation and people can sympathise, seem to make it the common mother of all. The awful ruins of its former greatness, the proud ornaments of its early years of glory, the accumulated memorials of long ages of vicissitude, and the noblest works of art and genius in every age, unite, in giving it an interest and a dignity, which no other spot on earth can ever boast. As I gazed upon it—all the long story of its fame, the deeds of its heroes, the shades of its philosophers, and the strains of its poets, burst upon my memory, and filled my heart with emotions that could not be repressed.

"Yet who, without emotion, could tread the soil ennobled by so many ages of glory, or behold, unmoved, a spot in whose very name there is enchantment? All that we have read, thought, admired and worshipped from our earliest years,—all that awakened our youthful enthusiasm,—all that exalts the mind, fires the imagination, or touches the heart, is concentered on the soil of Italy, and amidst the ruins of Rome."*

* Rome 19th Century, p. 100.

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Who can peruse these observations, without feeling the most anxious wish for the success of the proposed measures to restore the fertility and the salubrity of the Campagna di Roma?

Ably has a poet sung,

"'Tis Rome demands our tears,
The mistress of the world, the seat of empire,
The nurse of heroes, the delight of gods,—
That humbled the proud tyrants of the earth,
And set the nations free,—Rome is no more!,,

Perhaps the best plan would be, to have a company erected, with a sufficient capital, to purchase, from the Roman government, the property of the whole tract in question, *under the obligation of improving it.* The practicability of that improvement, I hope, has been clearly pointed out in the preceding observations, and that nothing is wanting to complete that great object, but adequate funds to carry it on. It would certainly be necessary, previously to have the whole tract examined by skilful engineers from England, accustomed to the drainage and improvement of fenny districts, and who are also well acquainted with the burning and management of lime, for on the utility of that manure, great reliance may be placed. But, on the whole, there can be no doubt, that by the judicious application of skill and capital, the "Campagna di Roma," may be rendered as productive, *and as healthy a district*, as any tract, of a similar extent, and similarly situated, in any part of Europe.

The experience both of England and of Scotland, has proved, in the most convincing manner, that by the introduction of agricultural improvements, the greatest changes may be effected in the climate of a district; and that it is possible to have luxuriant crops produced on the same soil, "*where formerly, noxious vapors abounded, impregnated with disease and death.*"

Attention to this interesting subject however, ought not to be restricted to the neighborhood of Rome. In other parts of Europe, more especially in the department of the Bouches du Rhone in France, and above all, in the neighborhood of Arles, the same measures might be adopted, *with almost the certainty of success*, and an extensive district exempted from disease, and brought into a state of productive cultivation. At present, the inhabitants of that rich country, pine under the attacks of agues during the greatest part of the year; whereas, by the means above suggested, that disease might be totally extirpated, and a district now unproductive, would be rendered the granary of France.

* Rome 19th Century, vol. i. p. 79.

What credit would not the government of France obtain, by promoting so great an impovement?

What foreign possession could be put in competition with such an acquisition; the protection of which would not occasion any expense,—which could not be conquered by any foreign enemy which would give employment, and subsistence, to such multitudes of valuable subjects and which would also be the means of rendering France independent of other countries for grain?

133. *George Street, Edinburgh,* }
15th April, 1833. }

[The pamphlet from which the foregoing article is copied, was sent from Europe to our correspondent G. W. F. by its philanthropic author, and has on it the following question in his hand writing: "Could not the enclosed *hints* be of use in America?" In one point, if no more, they certainly may, by the annunciation from such high authority that the use of calcareous manures serves in a high degree to add to the salubrity of the air. That most important fact, as a deduction from the chemical powers of calcareous earth, was pressented to the readers of the Farmer's Register; (page 76, No. 2,) more as a theoretical doctrine, than the result of sufficient practical observation. Since, various facts, from different sources, have been brought to sustain the position; and none will be more valued than the opinion here stated by Sir John Sinclair. He has probably arrived at the result by a very different course of reasoning, and of observation—and therefore, the more value may be attached to the agreement of opinion between persons as much separated by difference in their habits and studies, as their habitations are by distance.]

For the Farmers Register.

PAMUNKY MODE OF CULTIVATING CORN,

The simplest, and best on flat land, and on a large scale, because the most labor-saving.

I have lately seen so many different ways of cultivating corn in our agricultural publications, the Farmers' Register among the rest, that I have thought it would be worth while to publish the Pamunky mode of cultivation, which I had before thought, was the one in general use in Virginia, for crops on flat land, and on a large scale—and which in my opinion for such land is decidedly the best.

The Pamunky mode is as follows, if I have been rightly taught. You break up your land in winter and spring, with large ploughs into five and a half, or six feet beds [*Note* 1,] and plant as early as you can in April, by first running a tolerable deep furrow with a one or two-horse plough right on the top of the bed lengthways, and dropping your corn in this furrow, about three feet apart between the hills, [*Note* 2,] and covering either with the feet or hoes. The latter, however, is much the best way, as planting the corn with the hoes, gives the top of the bed, or ridge, a slight working, which is of very great service, if the weeds or grass have begun to grow, as they sometimes do after a mild winter on land that was ploughed early. Some persons run a light furrow across the beds every three feet distance, to show where to plant the corn; but the most usual way is for each hand to step off three feet in the row while planting, and the overseer carries a measure or stick three feet long, to regulate the step occasionally, and in that way the hands soon acquire great accuracy.

After the corn is about six or eight inches high, the two-horse ploughs start to "siding down" as it is called, which is to run the bar of the plough next to the corn, and throw down a good furrow from the corn, (and not throw the earth to the corn, as Col. Taylor [*Note* 3,] in his Arator, says, in his first ploughing of corn. I think there must be some mistake in the edition of Arator that I have, for corn will not bear the earth to be thrown to it, with a large two-horse plough, while it is so young, and when the first ploughing ought to be given to it, *preceding* the hand hoeing, instead of *succeeding* it, as Col. Taylor directs in Arator, which saves a vast deal of labor—however more of that hereafter.) As soon as the ploughs have got a little start in siding down, the hoe hands follow and "ridge out," as it is called; that is to say, with the hoes they weed, and scrape away the earth, weeds, and grass, from the corn, which was left on a narrow ridge by the siding down of the ploughs. The object of this ridging out, is to expose the young corn as much as possible to the sun, (which is not very powerful at this season of the year,) to strengthen it and drive away insects, such as ants, cut worms, wire worms and all insects that the sun has the power of driving away. Besides, the corn now being on a narrow ridge, facilitates the hoe work very much, as there is very little left for the hoe to do, if the ploughing has been well done. Also if there is wire grass, or blue grass, it is the easiest, and in fact the only way that I know of, to enable the hoes to get the grass away from the corn: and unless you do get it away, you will make no corn to a certainty: for if you cover up blue grass or wire grass by throwing the furrow, that Col. Taylor speaks of, to the corn, so far from their being killed thereby, they will grow faster than the corn, and choke it while so young.

Together with this ridging out with the hoes, the hands at the same time thin out, and replant, or set the corn, if the land is sufficiently moist. This ridging out, is generally considered the most important part of the whole cultivation. It gives the corn such a start as nothing else will, by admitting the sun to the roots of the young corn, and driving off insects of all kinds. I have frequently made experiments of admitting the sun to the roots of the corn when very young, in this way, and worked some hills in other ways, for instance, by weeding the grass well off from the corn while young, and then putting the earth back to it—and I have invariably found the corn that was exposed to the sun by siding down and ridging out, would take an earlier start and grow off more kindly, and the other never to overtake it. I have even, on good loamy rich land scraped the earth away so much from the corn at this early stage of it, as to cause it to fall down, merely as an experiment, and even in that state, it would rise and get the start of corn that had the earth thrown up to it. But it will not do on poor, or very stiff land, to make the corn so bare as to fall down: the above was merely an experiment to see how far it could be carried with impunity. Corn is very like cotton in this respect, and requires the same sort of cultivation while young.

As soon as you have gone over all your field, siding down with the ploughs, and ridging out with

the hoes, &c. you then, with the same two-horse ploughs, (the corn now being large enough to bear the earth, being generally about two or three feet high, and out of the way of cut-worms and other insects,) throw a good large furrow back to the corn on each side, and nearly or quite lap up the earth on the foot of the stalks, which saves a great deal of hoe work. Your hoes follow the ploughs again, and weed over the corn; and put a flat hill to it, and in that way check the grass and weeds.

After getting over the field in this way, the next and last operation, is to throw another furrow with the two horse ploughs [*Note* 4,] from the centre of the "balk," as it is called, to the corn on each side, and this must be a large and deep furrow, so as to reach as near the corn as possible, though it cannot quite reach it. The hoes again follow the ploughs, and weed over the corn and put a large flat hill to it, and kill the weeds and grass as well as possible, and this is what is called "laying by" the corn. [*Note* 5.] The corn is then generally ready to begin to tassel and shoot, or is tasselling and shooting. Sometimes it is necessary to run a skimmer up and down the rows of corn, if it should be grassy after the last ploughing and weeding, merely to scrape out some of the grass; but this latter operation is not absolutely necessary for the crop of corn, though it makes the sowing of wheat easier and better in the fall. But it is very dangerous to tamper with corn after it has begun to shoot and tassel, unless you can have rain whenever you call for it. I believe there has been more corn lost by working too late, than by grass.

You will remark, that by this mode of making corn, each operation suits the age and size of the corn. In the first process, (the siding down, &c.) you run the ploughs very close to the corn when it is young and the roots have not extended far, so that you do not cut many of them: or if you do, you do no injury to the corn while it is so young. In the second operation, (the throwing back the earth to the corn,) you run the ploughs farther off, when the corn has attained some size, and when it might be injured by cutting the roots, if there should be very dry weather afterwards. In the third operation (the "laying by" &c.) you run the ploughs still further off, when the corn would be more apt to be injured by cutting the roots, if you should have a drought afterwards.

Although three times going over the corn with the hoes, appears very often for a mode of making corn which pretends to be the simplest and most labor-saving, the fact is, where you have not wire grass, or blue grass, to contend with, the hoe work in this mode of making corn is very quickly done, and the three hoeings are not more than equal to once and a half the times of hoeing over corn in other modes of cultivation. For you will remark, that in the first weeding, or ridging out, you have only a very narrow slip, or ridge, not more than six or eight inches wide to weed, which can be done very fast. In the second weeding, the plough has nearly done all the work, for the earth is nearly lapped across the foot of the corn, so that it leaves not much for the hoes to do; and in the third, and last weeding, although the plough has left rather more to weed, yet it is not more than a common hoeing; but this is the "laying by," and the most tedious of the three, as is to be expected.

When the land has either blue grass or wire grass, you must use the double shovel, [*Note* 6,] or scarifier of some kind, (the double shovel is the best,) frequently after every ploughing and hoeing, and you must have a dry summer in addition to all this too, to kill it; for wire grass, and blue grass must never be covered up with earth (if you wish to kill them) and the double shovel, or scarifier, prevents that by dragging the grass up to the surface, so that the sun may kill it.

There may be better ways of making corn than this, with more labor; and by more tillage, you also may have a cleaner field to sow wheat upon in the fall: but, for the same amount of labor, I repeat that in my opinion, this mode of cultivating corn is the best. H. C.

Note 1.—Some persons break up their land flush, and then cultivate it in the way I am about to describe; but for flat land, bedding is preferable, as it keeps the land drier in the winter, and enables you to plant earlier in the spring.

Note 2.—Some persons plant nearer or farther according to the strength of the land, but three feet from hill to hill is the most usual distance, and then leave from two to three stalks in a hill, according to the strength of land.

Note 3.—Col. John Taylor certainly ought to be considered the most useful man to the Virginia agriculturist we have ever had, and is well entitled to our gratitude; for he was the first man in Virginia, who ever turned our attention to the subject of improvement, by his success in agriculture, as well as his writings on the subject. A part of his system, however, did not suit hilly broken lands (and no doubt was never intended by him, to be applied to them, though it has been very injudiciously so applied,) however well adapted to flat lands the north and south bedding may have proved.

Note 4.—Some persons use the one-horse plough in each ploughing of the corn, and then they have to run more furrows at each ploughing; but the two-horse plough is much preferable.

Note 5.—It should be observed, that although the corn has been ploughed over three different times, and very efficiently too, yet the land in fact is only gone over entirely, once, which is the greatest possible saving of plough labor, and a vast saving of manure on the land manured for corn; for the less frequently you turn up your manure, in the cultivation of the corn, to the hot summer's suns, the less is lost by evaporation.

I have said nothing about manuring, &c. for corn here, because I set out with the view simply of giving the mode of cultivating the crop as practised in the great corn country of Virginia, the Pamunky, where I think the mere cultivation of it is very well understood.

As I said before, this mode of cultivating corn does not answer on very foul lands, such as wire grass, or blue grass, or any other very stubborn grass land, without the addition of some scarifier, such as the double shovel, after each ploughing and hoeing; but with this additional cultivation, it is the best possible mode, even on the foulest land. The Pamunky corn lands are generally clean lands.

Note 6.—The double shovel when well constructed, is one of the best scarifiers, and in fact, one of the very best farming implements in the world. It is the only plough, or utensil of any kind, with which I could ever check blue grass or wire grass. It goes tolerably deep, and yet does not choke up much, and it keeps the grass near

the surface, so that the sun may kill it. It also keeps the surface smooth and level, and thereby prevents hilly land from washing. It is somewhat like the harrow in this respect; and the greatest advantage of this plough is, that it goes over so much ground in the day, and enables you repeat it so frequently. I cultivated about thirty acres of blue grass land in corn this last summer 1833, in the Pamunky mode, and after every ploughing and hoeing, as before mentioned, I ran the double shovel about four or five times in each row of corn; and it completely eradicated the blue grass, and left the land clean for wheat.

For the Farmers' Register.

ON HILL-SIDE DITCHES—TO PREVENT THE WASHING OF BROKEN LAND.

For the last four or five years my best reflections have been given to the subject of resuscitating our broken down lands, and preserving those not already exhausted, by a system of cultivation the most improvident and niggardly. It will be at once perceived that I allude to the custom in middle Virginia of cutting down our best lands and cultivating them successively in tobacco, corn, wheat, oats, &c. until the gullies are too deep to plough over, and the intermediate spaces too poor to bring black-eyed peas. This may be considered by those unacquainted with the habits of our forefathers, as an exaggerated picture; while all those who live in this section of country, know it to be a melancholy fact. I am happy to say, however, that this practice, as well as the policy which dictated it, is rapidly growing into disrepute, and that now an enlightened and liberal spirit of inquiry is abroad in our land, crying, "who shall show us any good in the way of improvements?" And permit me here to say, Mr. Editor, that your excellent periodical is admirably calculated, not only to increase that spirit of inquiry, but to encourage and facilitate us in the march of agricultural improvement. For myself, I must say that I have not only been highly entertained, but manifestly profited by the perusal of every individual number. And, while I am highly pleased with these salutary indications of brighter days in the system of agriculture of middle Virginia, I feel constrained to acknowledge that amongst the various expedients adopted to produce these results, the one with which I have headed this communication, meets with my unqualified disapprobation. I trust, therefore, that the suggestions I shall urge, if they have not the force to dissuade those who have already embarked in this system to desist, they will at least have the tendency to induce those who have not yet commenced, to ponder well the consequences of a system, if not manifestly injurious, at least of very doubtful propriety. It would be remarkable indeed, if when the public mind is under a high state of excitement upon any subject whatever, heresies should not creep in and attain almost the currency of well grounded truths. I am not at all surprised then, that where the whole country are crying, who shall show us the best way to stop gullies, that even well informed men (upon most subjects,) should come forward, and tell us, that the very best way to stop a gully, is to make a gully; or in other words, if you wish effectually to stop one gully, make ten—for this is about the proportion made, to one stopped, according to my observation. So fashionable is it becoming to make gullies in this part of the country, that I have actually seen fields, comparatively level, that have been cleared and regularly scourged for more years than I have yet lived, carefully and regularly ditched all over; not forsooth, that they *had* washed, but because they *might* wash. In these strictures there is not the slightest disrespect designed towards the author of a well written communication on this subject in your November No. of the Register; for I am pleased to acknowledge him both as an acquaintance and friend, and trust then our remarks will have no other effect than to elicit the truth; that being established, I shall rest content, whether found in favor, or against a system so obnoxious to me.

After these general remarks, I shall now endeavor to enumerate my objections specifically to the practice of horizontal ditching. And, first, I object to it because there is a useless waste of land in laying off the trenches: at least six feet being required for each trench; that is to say, trench three feet, bank two, and one foot on the opposite side not cultivated, for fear of filling up the trench. Now in a field regularly laid off in this way, at least one acre in ten will be taken up in trenching. For example; the field of Mr. Bruce's, referred to in his communication, containing two hundred acres, would yield up twenty acres for the security of the remainder; and this, at the usual rate of product for good highland, say five barrels of corn per acre, shows a clear loss of one hundred barrels in the product of the field. This proves a heavy tax upon the best possible improvement. This calculation is not designed to be entirely accurate; but on examination it will be found not far from the truth. Again, these trenches are made for every thirty yards; and of course all the water that falls in a hard rain between the trenches must run into them; not along the whole length of the trench, but in separate rills, or small bodies, for this is the nature of water. Of course then, it must carry in some of the adjacent soil. And where does it carry it? Not into the bottoms to make them wider and richer, but into the muddy branch or swelling stream. For, if there is not a ditch in the bottoms, the water from all these trenches emptied into them, will soon make one. It seems then that trenches must impoverish the land immediately above them, whatever Mr. Skipwith, or any one else may say about not losing a pound of soil. But this is not all. I object to the practice because it presents considerable obstacles in getting off the crop. For where they are made as deep as Mr. Skipwith's, a multitude of bridges are absolutely necessary, and they are both expensive and troublesome; and when they are not so deep, you are compelled to throw in timber, in order for the carts to pass over—some of which are almost certain to be left in the trenches after the crop is gathered, and then the first hard rain that comes, breaks out and causes double destruction, owing to the accumulation and velocity of the water in the trenches. Tell me nothing about these obstructions being carefully removed in time to prevent injury in this way. I know full well the practice of overseers and negroes in this respect, and firmly believe that universal injury is sustained in this way; for I have seen fields literally torn to pieces after the crop was taken off, from this neglect. If the carter finds a shallow place in the trench that

he can pass without upsetting, across he drives—and the first rain takes the cart track, and down it goes with tenfold velocity to the next trench—breaks over that, and so on until it reaches the bottom, carrying destruction before it. These are matters of fact, obvious to every man of common sense. And lastly, I object to any improvement, the details of which are so hard to be complied with, as to insure their non-fulfilment in nine cases out of ten. As the value of all improvements consists mainly in their simplicity, their cheapness and their complete accomplishment of the end sought to be obtained, (in all of which respects the trenching system is deficient,) I shall do all in my power to check its extension; and recommend to all those who have not fully entered into that system, to try the one I shall hereafter describe, in contrast; and if it is not found preferable, in all the particulars above referred to, I will forfeit my claim to any knowledge of the practical improvement of our lands. In the first place then, if you have a field you design to secure from washing, and improve under regular cultivation, sow it down in small grain, (wheat, oats or rye, as it may suit the taste or interest of the farmer,) and sow all the hill sides too steep for convenient and profitable cultivation, and all the narrow bottoms running up into the field, in herds grass, so that it will have formed a regular turf, by the time the field comes round upon the four shift system for cultivation in a hoe crop. Then when you commence ploughing the field preparatory for the hoe crop, (having prepared yourself with a common rafter or water-level,) take your station with your best ploughman about the middle of a hill, thirty, forty or even sixty yards from the top of the hill, (according to the declivity,) and mark off a track for the plough to follow, giving about an inch of fall to every twelve feet, until you meet the plot of turf in the bottom on your right; then return where you started and proceed in the same way until you reach the opposite bottom, which gives the foundation for the first bed. In throwing up the bed, be careful to leave as much solid ground in the middle, as the plough will cover with the two first furrows, and then complete the bed with four other furrows, thrown up as high as possible. Then go on thirty or sixty yards lower down, (according to the length of the slope,) and throw up another bed in the same manner, always emptying the furrows on the turf in the bottoms, which should never be broken, and so on until you have thrown up beds enough to protect the whole field from washing, which will be effectual if laid off with even tolerable accuracy. Your other ploughs, in the meantime, may have followed on, bedding or flushing the land, being careful whenever they get to a bed to plough it over again; that is, double bed it, in order to make it higher, and strong enough effectually to resist the strongest current of water that may come against it, the water furrow on the upper side of the bed being designed to carry off the water to the grass in the bottoms, from whence it will be safely conducted out of the field. In planting your corn in the spring, plough the beds also, being careful, in cultivating the corn, never to throw down the beds, but always to dress them up with the plough and hoes. Thus you lose not one foot of ground, and your land is safe from washing; the bottoms and steep hill sides, (if rich enough,) will afford you a fine crop of hay, which is worth as much as any other crop whatever. These beds present no obstacle to your carts in getting off your crop, being so broad as to be passed with facility, and so high as not to be easily cut through with the wheels and made liable to be broken with the rains. Here is a system then that is remarkable, 1st. for its simplicity; 2dly. for its cheapness; and 3dly. for its complete adaptation to the end in view.

I know a farm in this part of the country that ten years ago was a complete waste, being literally covered with hen's-nest grass and gullies, that now, under this system, presents a prospect every way delightful to behold: instead of hen's-nest grass and gullies, you now see the majestic corn, the waving wheat, and the heavy swath of mown grass. Where there were gullies from four to six feet deep, is now a solid turf of herd's grass, yielding heavy crops of hay. In fact, the whole farm presents a scene of luxuriance and plenty, amply repaying its owner for all the toil and expense he has incurred in restoring it to its (more than) original fertility. One of the most pleasing reflections I have, growing out of all my farming operations, is that of having restored worn out and waste land to fertility and life again. Indeed I feel thankful and happy, in having it in my power to say, that, in the ten years I have been farming, I have increased the fertility of fifty acres for every one that I have injured. And in the whole ten years, I have not cleared more than was absolutely necessary for rails and fire wood; finding it easier to improve two acres than to clear one. I think it a criminal abuse of the gifts of Providence to cut down and wear out land, and turn it out to grow up in hen's nest grass and old field pine. Such has been the ruinous policy of our forefathers: and hence it becomes the imperative duty of us, their posterity, to deprecate and abandon a system so injurious in its tendencies and ruinous in its consequences. And I am happy to say, that in this part of the country, mind is operating upon mind, and opinion struggling with opinion, for light and knowledge; every faculty of man is in a state of improvement; intelligence meets with and combats ignorance, and ignorance becomes enlightened by the conflict. So also in religion, infidelity is overcome by faith, and truth elicited by error. In such a state of things while every man is testing his own powers, and examining the advances and capacities of others, and attempting to place all things on the immutable basis of truth and justice—although there may be a good share of error abroad in our land, yet I feel disposed to congratulate my agricultural brethern, (not that we have attained to a great height in the scale of improvement, but) that our noblest faculties and energies are exerted (*mainly*) in the right channel, and are rapidly progressing to a happy consummation.

WARDSFORK.

Charlotte, Jan. 2d, 1834.

[It is not our province to determine between two farmers on a subject on which each has drawn information from practical experience, as well as a full consideration of, and reasoning upon, existing circumstances. But it may be permitted us to say, that there is much less difference between our former and present correspondent, than would be inferred from the commencing remarks of the latter. While condemning some of the minor parts of Mr. Bruce's plan, Wardsfork, indirect-

ly, confirms the great value of it in general, by advocating one which is the same in general features, though perhaps improved by him in some particulars. Discussion is desirable to settle those minor points of difference; though none of them can be so objectionable as to prevent the entire plan of either, if adopted, proving of incalculable value to the cultivator of hilly lands.

There is one part of Wardsfork's plan of which we have long experienced the utility, and of which the benefit may be gained in connexion with any general plan of tillage: that is, to leave unbroken by the plough the middle of every descending depression, or hollow, on a slope or hill side, over which torrents of rain water must be discharged, and where gullies either have been, or certainly will be formed, without this precaution. Such strips of unbroken land would be pronounced "eye-sores" by many farmers, whose sense of propriety is offended by leaving even the most barren spots of a field untilled. But ugly and slovenly as many of such strips may seem, they are less unsightly and less inconvenient than the gullies which they will prevent. A well set growth of grass on these places will resist the strongest transient torrent.]

QUERIES ADDRESSED TO JAMES RIVER FARMERS.

To the Editor of the Farmers' Register.

Essex County, January 15, 1834.

I have received your valuable work, the Farmers' Register, and am much pleased with it. I am a young farmer, and stand in need of all the information I can procure. I had determined to go on the four-field clover and plaster system before I received the Register: but did not so fully understand it until I saw the communications from the James river farmers, which have more fully determined me to pursue their systems fully: in consequence of which I should like to have some further information as to particulars, viz: The best size, number of teeth, and length, and manner of making harrows or rakes, to put in wheat, and if they use the same on their light as on their stiff soils; and how they manage their corn on their wheat land, in eleven feet beds: Whether or not they plough flush, or bed for corn: and if the water-furrows do not interfere in bedding—that is, will there not be a high bed and a low one.

What time do they sow plaster of Paris, and which answers best, on the first spring after seeding the clover on wheat, or the following spring.

A SUBSCRIBER.

ERRONEOUS OPINIONS.

From the Genesee Farmer.

The errors of great men are sometimes mischievous. Tennant, a long time ago, discovered that magnesian lime-stone was hurtful to lands as an agricultural application. His opinion has been adopted by almost every philosopher in Europe down to the present day. But the Pennsylvanians, on analyzing the lime which has for many years fertilized their lands, have found, that the magnesian lime-stone is the most beneficial. The difference in effect may be owing to the difference in the quantity applied. In Great Britain, they dress an acre with from two to four hundred bushels; in Pennsylvania from 50 to 70 bushels suffice. Davy has made the nutritive matter of the potato quintuple that afforded by the turnip; and hence it has been inferred, that one bushel of the former is equal to five of the latter for fattening cattle. Here, emphatically, "the proof of the pudding is in the *eating*." Repeated experiments have demonstrated, that the Swedish turnip will go as far, bushel for bushel, in fattening a bullock, as potatoes. The product of the Swede is double that of the potatoe (excepting *this year*, in the experiment of O. P. Q. of Bloomfield)—and it is cultivated and harvested with half the expense that is bestowed upon the latter. The difference in the expense of fattening upon the two roots is at least one half in favor of the turnip.

For the Farmers' Register.

ON THE MANAGEMENT OF NEGROES.

Addressed to the Farmers and Overseers of Virginia.

The management of our slaves is a subject of some little difficulty, but which difficulty may be overcome by a judicous system, (where there are no foreign causes operating to prevent it, which foreign causes I may hereafter speak of.)

I consider our Virginia negroes as forming a most valuable class. They have some of the best traits of character of any people on the globe. For instance, they are more generally good tempered than other people—they are kind towards each other, and are almost universally good hearted: they are generally grateful for favors, have the strongest local attachment, endure fatigue and hardships with great patience, are very contented, and cheerful—and in fact, are the happiest people in the world, unless tampered with by fanatics. With all these good qualities they have as few faults as most people, and it only requires system and some little management to make them valuable as a class of laborers, and contented and happy among themselves. In the management of negroes there should always be perfect uniformity of conduct towards them; that is, you should not be too rigid in your discipline at one time and too lax at another. They should understand that real faults will not go unpunished; but at the same time moderate punishment, with a certainty of its succeeding a fault, is much more efficient in producing good conduct, than severe punishment irregularly inflicted—that is, sometimes inflicted for an offence, and at others omitted, when the same or a worse is committed: for the ill-disposed will always risk the chances of escaping punishment altogether. It is the certainty of punishment, and not its severity, which deters from misconduct: and in fact, after a while, on a well regulated plantation, that certainty will prevent the necessity of inflicting punishment almost entirely. The best evidence of the good management of slaves, is the keeping up good discipline with little or no punishment. The next thing to uniformity of conduct towards slaves, is the impartiality of treatment to be used towards them all, unless for particular good conduct, and then it should be understood as such. Rewards should also be made a part of the system, whenever there is displayed particular good conduct; and praise now and then judicously used, goes a great way in their management. I have known a very lazy fellow who had

been frequently punished for laziness without the least effect, spurred up, and made one of the most industrious fellow on the plantation, by a little praise. One day this lazy fellow was seen to be rather brisker at his work than usual for *him*, though by no means very brisk; however, I thought I would try what effect praise would have upon him, and in riding by him said, "Well Joe, you are improving; you are getting along quite fast." Joe, with a smile, said, "Do you think so master?" and moved on a little faster. The next day or two, when I saw him again, I said, "Why, really Joe, you are doing quite well: you are getting to be quite smart with your work." "I am glad of it master," said Joe, with cheerful face and a much more active step than I ever saw him have before. In five or six days after that, when I went where Joe was, I found him ahead of all the other hands. "Well Joe, you have got ahead of them?" "Yes master, and I mean to keep there too;" but it was too hard a tug for Joe to smile this time. However, we have never had cause to find fault with him since about his laziness. A few kind words will often go a great way. I would recommend to my friends, the Virginia overseers, to use a little flattery sometimes instead of stripes. In the management of slaves, the temper and disposition of each negro should be particularly consulted. Some require spurring up, some coaxing, some flattering, and others nothing but good words. When an overseer first goes upon a plantation to live, he should study their dispositions well, before he exerts too much rigor. Many a noble spirit has been broken down by injudicious management, and many a lazy cunning fellow has escaped, and put his work on the shoulders the industrious. Give me a high spirited and even a high tempered negro, full of pride, for easy and comfortable management. Your slow sulky negro, although he may have an even temper, is *the devil* to manage.

The negro women are all harder to manage than the men. The only way to get along with them is by kind words and flattery. If you want to cure a sloven, give her something nice occasionally to wear, and praise her up to the skies whenever she has on any thing tolerably decent. In the management of negroes it is particularly necessary to elevate their notions of honesty and character as much as possible, and never to charge them with dishonesty unless you have positive proof of the fact. You should not be too suspicious of them. A negro girl, who was under my first overseer's wife, could not be trusted at all, and was charged with many thefts. On changing overseers, the wife of the next missed something, and it was suggested to her by some of the other negroes that this girl was the thief; but the overseer's wife being more unsuspicions than most persons, said she could not belive that a girl of her good countenance could have committed a theft; and that very speech, I believe, together with her mild and unsuspicious conduct towards her, cured the girl; for she has borne a good character ever since.

Never put temptations in their way, by leaving keys or money carelessly about. Many a negro who would never have committed a theft in the course of a long life, with a careful overseer or master, has not been able to resist the temptation, when a careless overseer or master has left keys lying about: and when once the ice is broken, and they lose character, they soon become hardened in villainy. It would be better to give up the keys to the negroes and trust to their honesty, (many of them are trust-worthy,) than to leave them carelessly within their power; for they feel a kind of pride when trusted, which might possibly make them go straight, when this manner of tempting would be sure to make them dishonest. The proper course is to put no temptation whatever in their way.

Too much familiarity with negroes ought never to be indulged in by the master or overseer, as it causes them to lose the proper respect for them. But kind words may be used whenever they deserve them, without being too familiar with them. The master and overseer should always pull at the same end of the rope. Negroes soon discover any little jarring between the master and overseer, and are sure to take advantage of it. The overseer should always coincide with his employer, and carry all his views fully into effect; and both should go on harmoniously together, and that alone will make the management of the slaves much more easy. No overseer, however high his standing, should hesitate to obey implicitly the orders of his employer; for how can he require those under him to obey him, unless he obeys those over him? The first duty of those who expect to command, is to learn to obey.

Harmony among neighbors is very important in the successful management of slaves. If all the farmers in the same neigborhood had the same system of managing their slaves, and would unite in suppressing vice among them, and in keeping up a proper system of discipline, it would render their management much more easy, and render the slaves much more contented and happy. A good disciplinarian in the midst of bad managers of slaves cannot do much, and without discipline, there cannot be profit to the master, or comfort to the slaves. Discipline is just as necessary on a plantation, as in the navy or army.

It is all important for the morals as well as the comfort of the slaves, (to say nothing of the policy and humanity of the thing,) that they should be well clothed and fed; for they will steal if they are not well fed, and the very best remedy for hog stealing is to give the rogues a plenty of pork to eat. Negroes should have some of the luxuries of life too, such as fowls, eggs, &c. with which to buy coffee and sugar, a garden and fruit trees, all of which will save the master's fowls, fruit, &c, and aid in the facility of managing the slaves, and will serve to attach them to their homes.

The greatest bar to good discipline in Virginia is the number of grog shops in every farmer's neighborhood, and which ought to be put down by our legislature.

The melioration of the condition of the slaves in Virginia is very perceptible even within my time, that is, in the last sixteen or seventeen years, and will go on progressively with the improvement in agriculture. They are better fed and clothed, and less severity used towards them. In fact, there is no such thing as severity now towards slaves in any part of the state that I am acquainted with, and there never will be any occasion for it again, if the fanatics will only let us alone; and there are fanatics south as well as north.

H. C.

For the Farmers Register.

SOWING CLOVER SEED.

There are few simple operations on a farm which are more difficult to introduce, and to have properly executed, than the sowing of clover seed. There are not many farms on which more than one laborer is a good sower of wheat—and even the best grain-sower will err greatly in his first attempts to distribute clean clover seed with regularity, and in proper quantity. Irregular sowing cannot be detected until shown by the after growth of the plants—and therefore a careless or lazy sower will seldom do any part of the work in proper manner. But this is not the only difficulty. It is necessary that the earth should neither be frozen, nor too wet for rolling or harrowing, (if such means are used to cover the seed,) and that the wind should not be high: and what with cold and wet weather of winter, and the strong winds that prevail in early spring, it is not easy to find suitable weather, at the proper time, for one man to sow a few bushels of seed, even in an irregular manner, wasteful of seed, and still more wasteful of the crop, and fertility to be derived from a proper covering of clover.

I propose a method of sowing, in which the most inexperienced laborer can distribute clean seed far better than I could ever have done by the best sower in the usual manner.

A convenient quantity of seed should be held in an apron, one end of which is to be tied around the sower's neck, and the other end held gathered in the left hand. The finger and thumb of the left hand also holds one end of a small light board (say twelve inches long and six wide) in front of the face, and the upper end sloping outward. The sower walks at distances of four and a half, or five and a half feet apart, and at every second step dips up as many seed as can be held between the tips of the thumb and two fingers of the right hand, which are thrown against the board with enough force to make them rebound and scatter well. The distribution of the seed will be very regular, and is not affected by the wind: and if the quantity of seed is found, by measure, to be too few, or too many, the remedy can easily be applied by altering either the *dip*, or the width of the row, or the length of the step of the sower. Young women, or stout boys and girls, are the best to perform this work; and as no skill, and but little care is wanting, as many as may be desired may be employed at once, and the sowing finished in a short time.

Now for regulating the width of rows, and covering the seed.

Many farmers, much more skilled and experienced than I am, trust their clover seed on the earth without any process to cover them; but I have never made the trial, that the seed were not found to be unequally distributed—and often, not half would live. Wheat land, on which clover seed are usually sown, by the proper time has become settled, and with a sleek surface, though continually varied by inequalities. As the seed are thrown, they slide or rebound from the little elevations, and are collected in the depressions of the surface. Then ten or twenty seeds will often be found in a spot of a few square inches, and as many square feet adjoining may be without any. If a light roller is used to cover seed so sown, its pressure will generally be made only in the spots where few or no seed remain, as the hollows will seldom be touched by it. I suppose the land to have been ploughed level, or in wide beds. If in narrow and rounded ridges, the objections would be still more increased.

The course that I prefer is this. When the surface of a sufficient part of the wheat field is dry enough for a horse to walk on without injury, and at any time from the middle of January to the 10th of March, (but preferring the earlier time,) a light square harrow having 20 teeth, and sweeping about five feet, and drawn by one horse, is started *ahead* of each sower. The teeth generally cut very superficially, even on the elevated parts, and do not touch the depressed surface, and these numerous scratches, with the earth thrown up, serve to furnish a proper receptacle for each seed at the precise spot where it falls, or certainly within a few inches distance. The higher spots will thus be as well supplied as the depressions, and the newly loosened mould will not only retain, but will cover the seed. A wooden roller however following, will certainly and effectually cover them. The row swept by the harrow, guides the course the sower who walks after it, and prevents any difficulty in preserving the proper distance. But few wheat plants are drawn up by the harrows, and no perceptible injury is ever caused by their being thus used.

Those persons who are willing to dispense with the use of the harrow, may find some difficulty in preserving equality of breadth in the casts. The corn rows (if that crop preceded the wheat) will generally remain plain enough to guide the sewer. When we sow on snow, the tracks of the sowers serve as a sufficient gulde, both as to course and distance, and in this manner the seed are more equally distributed, and better covered by the after-thawing of the earth, than if thrown on the earth without using the harrow. When seed in the chaff are used, (as they should be after the farm will yield them,) there is a still more decided advantage in sowing on snow, as in this case, the regular distribution is better secured.

R. N.

PREPARING FOOD FOR HORSES.

From the New York Farmer.

On the authority of Mr. Dick, it is stated that eight ounces of saliva are discharged in a minute from the salivary glands of the horse, when he is eating his food. In masticating hay, dry and hard as it generally is, these glands are kept discharging too long, often through the greater part of the night, to satisfy the appetite of the horse. It seems reasonable that this would exhaust his strength. Hence the propriety of lessening the *labor* of eating, by cutting or softening the hay, for an animal that so nobly and spiritedly toils for his master. The effect of feeding horses on dry hay is to wear away the teeth, and consequently, the labor is increased as the animal advances in age.

The use of potatoes for horses would be much more general if they could be more easily preserved through the winter and summer. The writer recommends to bury them five feet below the surface of the ground, where they will keep until August. Bean straw is said to be as nourishing to horses as hay. If so, it should be an object with the American farmer to cure it properly.

ESTIMATE OF THE EXPENSE OF LIMING LAND, FROM WATER-BORNE OYSTER SHELLS.

To the Editor of the Farmers' Register.

Charles City, December 2d, 1833.

I am sorry to have delayed sending you the estimate promised of the cost of applying oyster shell lime as a manure: it was however unavoidable. I might have given it before this, on my own responsibility; but preferred to have others of as much experience to assist me in making it.

In the first place then, the cost of shells brought to our landing places, is per hogshead of eighteen bushels, 62½ cts

To cost of getting them from the craft; if very convenient for landing,	2½
To cutting wood, allowing 12 cords for one hundred hogsheads,	3
To hauling shells to the wood, or wood to the shells, as may be most convenient, hauling out the shells after burning, slaking, scattering, &c.	32
	100

Thus making the sum of one dollar the hogshead. To afford then five hogsheads to the acre after burning, (which has been the quantity applied by myself and my brother on very stiff land,) one-third more must be added as the loss by that process; and I am inclined to the opinion that a fraction more may be added, which will make seven hogsheads, the cost of which I have shown above to be seven dollars; on a lighter soil, four hogsheads are deemed sufficient, which will diminish the expense one dollar. If there is any error in this estimate, I am satisfied that it is in the low rate of charges; and I am confirmed in this opinion by one of my tenants, who is a man of considerable experience, having refused to accept the offer of thirty-five cents per hogshead, as full compensation for all the trouble and expense of liming save the purchase and delivery of the shell.

C. H. MINGE.

ESTIMATE OF THE COST OF WATER-BORNE MARL.

To the Editor of the Farmers' Register.

Walnut Grove, Charles City, Jan. 1, 1834.

I am now enabled to complete the comparative estimate of the expense of lime and water-borne marl, for manure which you requested me to furnish. If the statements submitted are not full in every respect, they may at least be relied on so far as they go.

I commenced regularly to work about the 15th May to transport marl from Coggins' Point to my farm, a distance of fifteen miles by water, and ended on the 25th of December, a period of seven months. I had engaged in the business three hands, two of them at eight dollars per month, and the other a boy worth about two dollars and fifty cents. I purchased a craft, and when provided with all the necessary fixtures for commencing work, the cost was three hundred dollars. On the supposition, that this craft will at the end of ten years be entirely worthless, I will estimate the "wear and tear" or loss of capital therein, at thirty dollars per annum, the average annual repairs at thirty dollars more, and the expense of provisions for the hands at ninety dollars for the year. With these preliminaries, I think I may now fairly make out my account for the transportation of the marl as follows:

To cost of vessel, in "wear and tear" for seven months,	$17 50	
To average expense of repairs,	17 50	
To interest on $300, for seven months,	10 50	
		45 50
Hire of three hands for seven months,		122 50
Provisions for seven months,		52 50
Paid for uncovering marl; and for putting on board a part of the whole quantity,		70 00
		290 50

CR.

By 15,000 bushels of marl, at 1 14/15 cents the bushel (very nearly)	290 50

This makes the whole cost of the marl, put out at my landing, less than 2 cents the heaped bushel. The estimate for hauling, scattering, &c. I will leave for you to add; that depends however on the distance; and I can only say, that a single horse cart was fully sufficient to keep way with the craft, a distance of one thousand yards. I think I can safely say, that no one *can* meet with more difficulties than I have myself encountered in this undertaking; my landing place being so bad, that I have known the hands frequently engaged for a whole week in unloading the craft, because of very low tides; when if the water had been sufficient to admit them to the wharf, they might easily have accomplished the work in half the time. I feel also perfectly justified in saying, that had I been so situated as to have the advantages of a landing place which no tide could interfere with, that five thousand bushels more of marl could have been brought during the seven months.

COLLIER H. MINGE.

REMARKS ON THE COMPARATIVE EXPENSE OF USING LIME AND MARL.

The foregoing estimate may be implicitly relied on, so far as it rests on actual expenditures and operations—and in the items which are necessarily conjectural, we have every assurance of correctness, that can be furnished by the practical and business-like habits which characterize the writer. But as the estimate is not completely carried out, we will attempt to supply the deficiency, and will add some observations on the comparative expense of water-borne marl and lime.

According to the estimates of the cost of labor used for marling given in the *Essay on Calcareous Manures*,

A horse for a year's work, and including every expense, costs	$88 44	
A boy to drive,	44 67	
Cart and tools,	14 00	
	$147 11	
At which rate, the carting of 15,000 bushels of marl 4,000 yards, from the landing to the field in seven months, cost		$85 81
Spreading the loads, in the field, at ten cents the 100 bushels,		11 50
		$97 31
Cost of transportation &c. before stated,		290 50
Whole expense of applying 15,00 bushels,		$387 81

Or rather more than 2½ cents the bushel.

This estimate includes no charge for the marl, as none had been made. If half a cent were added for this, it would increase the cost to about three cents the bushel. On the other hand, the price paid for hire was unusually high, as free hands only were employed, and only such as could be relied on. The difficulty of obtaining this marl was very considerable, on account of the great thickness of superincumbent earth to be removed. Many other causes of difficulty and loss were encountered by Mr. Minge (all serving to increase his estimate to what it exhibits,) on account of his having commenced a perfectly new business, to every part of which, he and his laborers were alike strangers. But without making any deduction for any of the peculiar difficulties which attended the operations, and supposing half a cent a bushel, a fair price to pay the owner of the marl, the entire cost will be counted at three cents the bushel. By the preceding estimate the entire cost of lime, at $1 the hogshead of shells was 5 10-18, say 6½ cents the bushel. Now we will compare values.

Oyster shells are not pure carbonate of lime. They contain a portion (how much we know not) of animal matter, destructible by fire, and which is entirely lost in burning the shells. Whatever is this proportion of animals matter, it ought to be deducted from the weight and value of the shells. But not knowing this proportion, the shells will be here estimated as if they consisted of pure carbonate of lime. The marl, carefully averaged, and analyzed, was found to contain 91 per cent, of carbonate of lime.

A peck measure of oyster shells, which had been well washed and dried, heaped about 1½ inches, (supposed to be fully equal to selling measure,) weighed 16¾ pounds. The marl (an average of the whole thickness of the bed,) dried perfectly over the fire, and pounded, and pressed, by the hands only, in the same peck measure, weighed 20½ pounds, even, and 24 pounds heaped. The measure and weight were supposed to be fixed by correct instruments—but the same were used, and at one time, so that the relative weights, at least, are correct.

One hundred bushels of oyster shells, weighing 67 lbs = 6,700 lbs. making of carbonate of lime the same, lbs. 6,700

One hundred bushels of dried marl, weighing 96 lbs. = 6,900 lbs. and contain of carbonate of lime, lbs. 5,856

Thus the marl, which costs only a small fraction over one half as much as the total expense of the shells, contains about 6 sevenths as much of pure calcareous matter.

But one of these manures is applied mild, or in the form of carbonate of lime, and the other as caustic, or quick-lime: and some may doubt whether an additional value is not gained by the burning of the latter. This, we leave to others to decide. In most cases, in this climate, we should consider the causticity of lime as more likely to be injurious than beneficial. The minutely divided state of quick-lime, however, certainly enables every particle to come into immediate operation; whereas it might require two or three years before the full benefit of marl could be obtained. This somewhat slower action, at first, is the only reason why marl should not be rated, according to its proportion of calcareous matter, full as high as lime.

These results, which we have arrived at by quite a different route, do not differ materially from those obtained by Wm. B. Harrison, Esq. (No. 7, p. 396, Farm. Reg.) from his practice and experience. He applied burnt, but unslaked shells, at the rate of seventy bushels, and marl at 140 bushels the acre, on adjoining and equal land, and found the crops of the first and second years equally increased by both manures, but that of the third year much better on the marled part. To make seventy bushels of burnt and unslaked shells, 108 would be required, (according to Mr. F. Lewis' estimate, No. 1, p. 19, Farm. Reg.) so that according to the foregoing mode of calculation, Mr. Harrison's applications were at the rate of 108 bushels of oyster shells to the acre, and 140 of marl. His marl was from a bed of quality similar to that used by Mr. Minge, but was mixed with much worthless earth, and was transported at heavier expense.

This comparative estimate of values, has been made to apply to a particular body of marl, because the actual labor was there employed, and it was desirable to estimate as much as possible by facts, rather than on conjecture. But there are doubtless many bodies of marl on tide water, either richer, or more accessible, or perhaps possessing both those advantages in a higher degree.—Ed. F. R.

EXTRACTS OF PRIVATE CORRESPONDENCE.

New York, Oct. 18, 1833.

* * * I was bred up "a sort of farmer" in the county of West Chester, and have followed the plough in my time; but what little I knew of the rural trade has been in a great measure forgotten in the course of a city life. But I have not lost the rural feeling—and any thing that sends to my mind the image of the country, and of a country life, always offers agreeable associations. * * * It is somewhat singular, that the two best agricultural works I have ever seen, in my judgment, are the 'Arator' of Col. John Taylor, and your 'Essay,' both written in Virginia, where you all acknowledge the *practical* part of the business is about as bad as possible. I will add, without the least disposition to flatter, that I think the Farmers' Register bids fair to excel any thing of the kind I have seen, in practical utility. I am such a friend to agriculture, and to old Virginia, that it gives me sensible gratification to see these symptoms of attention to the great source of her dignified character as a state, as well as happiness and prosperity. He who derives his support from the bosom of the earth, will surely love his country as the source of all his enjoyments; he takes root in the soil from whence he receives his nourishment, and clings like a babe to the bosom of his mother. * * *

Easton, (E. S. Md.) Dec. 23*d*, 1833.

I commenced with No. 1 of the Farmers' Register, and have received to No. 7, except No. 2 and No. 6, which have never come to hand. I regret this very much, as I consider the Register the best agricultural paper in America, and wish to have them bound annually, for preservation. The complaint of the Register's not getting to hand regularly, prevents many persons in this part of the country from subscribing, who really wish to patronize the work. Perhaps on inquiry you may

be able to ascertain the cause of failure, and remedy the defect.

[The foregoing extract will give some idea of the inconveniences and losses sustained, in consequence of the negligence, or worse than negligence, of some post masters. We have supplied duplicate copies gratuitously, until fifty or sixty sets of numbers are destroyed, and yet have not been able to make up for all such losses. No publication in the United States in more carefully prepared for transportation by mail, by being securely wrapped, and plainly directed, on each copy, as well as on the whole package. Yet many single numbers, sometimes whole packages are lost, and are not returned to the publisher, but in a very few cases, when real mistakes of direction had been made. If the wrapper was destroyed, and every part of the direction effaced, still the name of the publication office must be known—and no one could be at a loss where to direct such copies.]

THE THREE-FIELD SYSTEM BEST ADAPTED TO THE CLIMATE AND SOIL OF THE TIDE-WATER SECTION OF VIRGINIA.

To the Editor of the Farmers' Register.

I have regularly received your valuable Register, and read many of your communications with great pleasure. I am sanguine in the opinion that the spirit of inquiry roused by your late work on *Calcareous Manures*, will be kept alive by the Register, and act most beneficially on the agricultural interests of the state. The Arator of Col. John Taylor, at the time of its publication, was hailed as a production of great merit. It is now, I think, treated rather slightingly;—though I by no means coincide in all the opinions advanced by the very sagacious and enlightened author of that work, yet I think (apart from his claims as a patriot and statesman,) Virginia certainly owes much to him in his character of agriculturist. He demonstrated by practical illustration and example that a worn-out soil might be rendered exceedingly fertile, and that agriculture might be made in this state the certain means of wealth; inculcating strongly the advantages of clover, plaster, manuring, enclosing, connected with deep ploughing. Like many other excellent works in the hands of the unskilful, it sometimes produced individual injury: this however was the fault of the injured, and not of the author. No system that has ever been devised, will suit all soils and climates. It must be left to individual intelligence, in the application of general principles, to make due allowance for the particular circumstances of each case. Inattention to this rule, and the want of minuteness of detail, often render the experiments of farmers so very different in their results. For instance, I have been informed by an intelligent farmer of Fauquier, that his most sucessful crops of wheat ou corn land have been made by sowing the grain on the land after removing the corn, without any previous preparation, and then passing over it a heavy harrow. This is doubtless true, and answers very well where corn is cultivated on a flat surface as in Fauquier; but in the tidewater section of Virginia, were corn is generally planted in beds, or on high ridges, a farmer would act very unwisely, if in imitation of the agriculturists of Fanquier, he scattered his wheat upon the unploughed ridges of his corn field. Again, from the accounts given in your Register of the immense crops of wheat made on farms where the four-field fallow system is in vogue, especially on the James river, it may be considered as fairly demonstrated that this system is best adapted to the soil and climate of that section of country where it is so extensively prevails, and is decidedly most profitable. Yet I question whether a farmer in the part of Virginia where I reside, would not be very unwise to adopt it;—for, from long obeservation and reflection, I am induced to believe that the so much abused three-field system suits us far better; and moreover, that under this despised system an exhausted soil may be quite resuscitated, and the farmer amply compensated for his labor. *I will concede* that land will improve *faster* under the four-field system, accompanied with green clover fallows and manure; and if I resided in a region of country well adapted to the wheat crop, I should certainly pursue the system which seems so popular. My preference of the three-field system arises entirely from the fact that Indian corn is so much more certain with us than wheat, and because I think the three-field suits the corn crop far better than the four-field system. The experience of years has convinced me that the wheat crop on the sea board is extremely precarious, subject to numerous casualties, some of which no skill or industry can remedy. It frequently happens in the spring, when the wheat is in bloom and promises an abundant yield, that the hopes of the farmer are blasted in a few hours by an easterly storm. I have often suffered in this way, and speak from experience. I mention this as only one of the disasters to which our wheat crops are subject, and which is beyond the control of man. Indian corn is the crop on which alone we can with safety rely. It is admirably adapted to our climate and soil, and seldom disappoints our expectations. Would it be right then for us to adopt a system which would render wheat our primary crop? I think not. In a country not well suited to hay, corn affords us the means of supporting stock and manuring extensively. The blade fodder will feed our horses—the shucks and tops our work oxen and milch cows—and the stalks themselves afford excellent nourishment for the cattle generally, good litter for pens, and constitute the means of retaining and applying to the soil the manure dropped during the season the cattle are confined. Again, if our lands are permitted to remain without the cultivation of a horse-hoed crop more than three years, they become so foul and hard as seldom to yield (without great extra labor,) in proportion to their fertility. To fallow them to advantage they must be in at least four fields, and then you must have two fields in wheat and only one in corn, thus giving the most uncertain crop precedence over the most certain. And as far as my information extends, it has never been ascertained by experiment whether our lands would yield wheat it fallowed for a succession of years. They would most probably become *puffy*, and throw out the wheat during the winter. After all, facts furnish the best arguments. I have noticed with minute attention the experiments of several of my neighbors, and will endeavor to give you the results. One divided his farm into four fields, and cultivated them successively in corn. His land, judging by the growth of vegetable matter, evidently improved; yet his corn crops declined, and his wheat crops were generally de-

stroyed by insects. He was compelled to return to the three-field system, since which time his crops have improved, and the yield of the present year (notwithstanding drought,) has exceeded that of any former year. Another gentleman had been making good corn, wheat, and barley crops, but possessing more enterprise than his neighbors generally, he adopted the five field system. His crops of corn and small grain have retrograded. He has had several crops of wheat on his fallow fields, which promised a most abundant harvest, and yet either from insects, or storms, or some other casualty, he has always been disappointed in the expected harvest; and I doubt not, though he is unwilling to admit it, that he will again return to the despised three field system. This last gentleman possesses all the requisite skill and industry to insure success. Another neighbor has been cultivating his farm in four fields for several years. He is a very neat manager. His lands are prepared in the best manner, and his grain is remarkably well put in. For several years his small grain crops increased, but latterly a great change has taken place. His barley crop (his principal reliance) has gradually dwindled, until this year, from the attacks of insects, &c., he may be said to have sowed himself out of seed, and to have fairly abandoned the crop. I will cite you another case. A farmer very near me, (a particular friend, who commenced operations on a farm impoverished and worn out by bad cultivation,) has lately thrown his farm into four fields. He has made great exertions to improve his land through manure, rest, &c. and his success is very flattering and highly creditable. Yet I think he is nearly convinced that the four-field fallow system will not answer, and that he will speedliy abandon it. His small grain crops have never come up to their promise, and the wild onion is gaining rapidly on him. Judge Semple of Williamsburg, an agriculturist of first rate skill and sagacity, has, through the medium of your paper, renounced his preconceived opinions of the four-field system, and intends retracing his steps with haste, if not with "fear and trembling." Again; I know no farmers in Virginia more prosperous, or who have made more money by agriculture, than those on the Rappahannock. They rely principally on Indian corn, and cultivate their farms in three fields. I observe too, that very few of your fallow farms (not aided by reclaimed marshes,) make more corn than answers for their domestic purposes.

The whole matter may be thus summed up. In those sections of country where the fallow system is pursued, and where the energies of the farmer are directed to wheat as a primary crop, the corn crop is proportionably small: and where corn is the staple, the wheat crop is seldom large. As wheat is made with less hoe labor than corn, it is wise to rely on it in a country adapted to its growth—especially too where corn would not bear transportation. But on the seaboard, where the markets are so accessible, and corn so certain a crop, it is safest for the farmer to make it his principal reliance.

I will now endeavor to show, and by referance to my own farm alone, that the three-field system is not necessarily an impoverishing one: on the contrary, that under it poor land may be rendered fertile, and the owner fairly compensated for his labor.

The farm on which I reside was purchased by my father, at about twenty shillings per acre. It was for years the by-word of the neighborhood, and constituted a sort of standard by which the poverty of other farms might be estimated. The manager, who lives with me, engaged with my father the last of the year 1813, for the year 1814. He informs me that the crop of 1813, a little upwards of one hundred barrels, was sold in 1814; and that in consequence of this *large sale*, my father was obliged to purchase corn, by the fall. For many years past the farm has been rapidly improving, though constantly under the three-field system; and the crop of corn made this year from about one hundred and fifty acres, may be very fairly estimated at one thousand barrels; of this, seven hundred barrels was made on a field estimated at ninety acres, the other sixty having been injured some years since by the passage of salt water over it, during a gust tide. Every time a field comes into cultivation, after yielding me a crop of corn and wheat, I consider it decidedly better than it was the year before. This is the result, I admit, of a laborious but profitable application of manure; and demonstrates, that without the aid of *lime or marl*, (the great value of which I am not disposed at all to question,) a farm may, by its own resources, be resuscitated. Every thing that can be turned into manure, or can be of service when applied to the land, is so applied; and however unfavorable the seasons may have been, my farm has for many years past always yielded a respectable crop of corn. The wheat crop has never been large—in no year having exceeded thirteen hundred bushels.

If I were to select a farm of moderate size in the tide water section of Virginia, I would take one of three fields of 150 acres each, with three or four lots of forty acres, which should be sowed in clover and fallowed for wheat in rotation, and having a standing pasture of moderate extent. I would then plant 150 acres in corn every year; I would sow a hundred acres of the corn land in wheat, and fifty in oats, which, with the forty acre lot of clover fallow, would give 140 acres of land in wheat, 150 in corn, and fifty in oats every year. This I am convinced would be far more profitable than if the same lands were divided into four fields, two fields in wheat, and one in corn; and simply because corn is so much more certain a crop with us, than wheat. The fifty acres in oats would nearly yield grain enough to feed the necessary horses during the year, (a smaller number being sufficient under the three-field system,) and thus leave a larger quantity of corn for sale. In fact after all, it is not so much the particular system that is adopted, as the mode in which it is carried into effect. If mine is well executed, I must remark in justice to my manager's untiring industry and excellent judgment, that he is mainly entitled to the credit.

I will at some future time, give you my whole system of cultivation, especially of corn. It is exceedingly simple, and so far as its correctness is to be estimated by its success, has proved a happy adaptation of means to a desired end. I will offer no apology to you, or to the public, for presenting these desultory remarks, as I am led te believe by your repeated invitations to farmers generally, to give the results of their experience, and from the character of your work itself, that any practical

observations on the subject of agriculture (however imperfectly or hastily they may be written) will be acceptable. W. H. ROY.

Green Plains, Matthews Co. Dec. 30, 1833.

[The foregoing interesting and valuable communication was deficient in one particular, which we consider has a most important bearing on the success and profit of using putrescent manures, viz.: the original state of the soil, as to fertility or barrenness. An inquiry on this head has brought the following postscript. The last paragraph is part of a private letter, and was not intended for publication—but we have taken the liberty to add it, as furnishing facts and opinions properly belonging to the main communication. We are very far from claiming any deference to our individual opinions on questionable points in agriculture, and it will always agree with our wishes, no less than our editorial duty, to publish as readily those views which conflict with, or may overthrow our own, as if they were in full accordance.

Mr. Lewis B. Wiatt is the overseer who has long been in the service of Mr. Roy. This is not the first time, nor through the only channel, that we have heard his merit referred to: but the mere fact that he has for so long a time, continued in the service of one employer, and continued to possess his confidence and approbation, are enough to prove that such a man is an honor to his profession.—ED.]

Green Plains, Jan. 17, 1834.

I am aware, that these statements appear to contradict the opinion expressed in your late 'Essay on Calcareous Manures,' that land originally poor, cannot be materially or permanently improved, by the use of putrescent manures, unless aided by lime or marl—but I give you the results of my experience, without pretending to assert what the fertility of the soil might have been, at a period so remote, as to be beyond the memory of my oldest neighbors. I only know, that it was proverbially poor, when purchased by my father, and judging of the peculiar properties of the soil, by the portion of land cleared by my father and myself, (as we supposed for the first time,) and by the appearance of that part which is still uncleared, I should suppose that at least a large portion of the farm had *never been fertile;* for even admitting that we were wrong in supposing it had never been in cultivation, yet from the size of the present growth on it, certainly it must have had sufficient rest, to renovate and restore it to its primitive state. There is a greater variety of soil on my farm, than usually exists on one of the same extent. In speaking of the properties of the soil, I now allude to it in its present improved state. The lands immediately on the river, are generally of a light character, with a substratum of clay. As you recede from the river, you pass a vein of what is called dark chestnut soil, and after passing this about a half mile distant from the water, the soil gradually stiffens. It has during cultivation a whitish appearance, and when ploughed wet, becomes very hard. It is the kind of land denominated with us "white oak land." This part of the farm is better adapted to wheat, than the lands on the river. It never heaves during winter. The term sandy loam as used in your Essay, expresses, I think, better than any other, the general character of my soil.

In writing on the three-field system, I had no intention of combating your previously expressed opinions, though I was well apprised of them, as they had often been a subject of reflection. If I were to venture to express an opinion in opposition to yours, I should say that your remarks were perfectly correct, when applied to poor soils of a particular character, where the greater portion consisted of coarse particles of sand: but that there are many soils originally poor, which might be rendered very fertile by the use of putrescent manures. In the main, I accord with the opinion of Arator, quoted by you, in the 36th page of your Essay on Calcareous Manures. In the 39th page of that work, you observe, "but no where can a farm be found, which has been improved beyond its original fertility, by means of the vegetable resources of its own arable fields." Now I certainly think my farm affords one example, with this exception, that I have not relied only on the resources of the arable fields, but have called to my aid the leaves from the woods, and the *sea-ooze*, which I have had carted from the river, in large quantities, and which affords a valuable litter for pens.

W. H. ROY.

VALUABLE MANURE—NEW-JERSEY MARL.

From the New York Farmer.

Mr. Fleet,—I have, according to promise, collected a few facts upon the Jersey marl, as a manure, and I submit them to you for insertion in the New York Farmer.

Every person to whom I have applied for information upon this new and valuable article, speaks of it as possessing enriching qualities, truly surprising, and of more general value than any known substance at present in use for that purpose.

Its effect was accidentally brought into local notice about sixteen years ago, by a farmer, who, having a ditch dug in a meadow, had the soil scattered over the piece: the ditch or drain happened to cut a vein of this marl, and the produce of the meadow was three-fold the ensuing season, upon the spot where the marl was scattered. Important as this was, no further notice was taken of it, and being of the old stamp, averse to any thing new, he neglected to profit by his accidental good fortune. That meadow still has a better bottom where the marl was spread. After this I can find no traces of its use till about nine years since, when, by some chance, Mr. Alexander M'Gregor spread a quantity on some grass land; the effect was great, and he informed me that the first crop paid him for the expense, in additional hay. That gentleman is now a warm advocate for it, and being a large owner, and a wealthy man, has caused it to be pretty extensively used for these last two years, for all kinds of crops, and he assured me last week, with entire success; yet one or two, who have pits of marl on their premises, still prefer disposing of it to improve other farms, rather than enrich their own. It is now ascertained that this marl forms a substratum in many parts of the Jersey coast, and therefore may be procured to any extent; and I am about to show you that its cheapness, durability, strength, cleanness, &c. will make it a valuable manure for the Long Island market-gardeners and farmers. If they once try it, they will no more buy the New-York manure at fifty cents the carman's load. I am assured by one re-

spectable farmer, that he considers one load of marl equal to five of dung. It is perfectly clean, and will even destroy many weeds. This is a great desideratum in garden truck. It does not readily freeze, and will work well all weathers, always ready for use, and may be spread any time from September to March inclusive. It makes an excellent compost; upon grass land it does wonders; a thick bottom and heavy swath of white clover is its certain produce. Potatoes, both the sweet and Irish, thrive well with it. Dung, it is known generally, flies into the tops of these, while marl scarcely alters the top, but greatly increases the size of the roots. Corn, buckwheat, cabbages, turnips, all succeed with it.

I am informed that five loads to the acre have produced a fine crop of buckwheat upon very poor land. It is used as a top-dressing on grass land, and may be spread from ten to twenty loads per acre, as late as March. One large farmer, Judge C., informed me he had used eighteen loads per acre; but there is some danger of using too much, particularly with poor light land. I have heard of some that was unproductive for five years, but last year it began to recover, and it is expected the produce will eventually make up for lost time, but it is certainly better not to overdo the thing. Give a second dressing the second year, rather than a surfeit at first. As far as experimental information enables us to determine, it continues its effects sufficiently nine or ten years. For corn and grain it is scattered on the top after ploughing, and well harrowed in. I cannot learn that it has been tried for peach trees, but I know one large grower who is making preparations to try it it this season.

This marl is evidently a marine deposit: it is found in hollows at two or three feet below the surface, continuing downwards to sixteen. Its upper strata is of a greenish blue color, the middle more inclining to gray; and the lowest is of an ash color; this last is considered the strongest. Observe, I speak of its color when dry; and I ought further to observe that other pits are said to vary much in color and quality: therefore, before trial the quality ought to be known. This marl has the appearance of sand, each little grain having a thick coat of decomposed vegetable matter, making them adhere together in lumps occasionally.

Shells, sea-worn stones, sharks' teeth, &c. are often found amongst it. The marl that is found in some places farther from the sea does not appear to be so powerful. From the pits where I selected you the samples, that accompany this, it is carted by land forty miles, the farmer paying from 2s. 6d. to 3s. per load by the pit side. A load is twenty bushels; a bushel weighs from one hundred to one hundred and three pounds, when dry.

I am about having the marl analyzed, so as to ascertain exactly where it will be most useful. I will communicate to you the result with some other experiments, for your next number; and should you wish to possess a larger sample for any of your readers to make trial with, I have prepared you some in barrels, with the price you can furnish it; for I can see no reason why it should not become an article of as much request as ashes, or plaster of paris, and will, therefore, be of as much commercial importance as coal.

D. A. AMES.

New York, September 24, 1833.

[On account of our preconceived opinions of the "Jersey marl," we felt anxious to learn the result of the analysis promised above; but having heard nothing more on the subject for a considerable time, we wrote to ask for small portions of the several specimens, and have just received them from Mr. Fleet, the editor of the New York Farmer, whose letter also states that no analysis has been made, within his knowledge. Intending to place all the specimens in better hands than our own for examination, we were unwilling to lessen the samples (which were necessarily made small, being sent by mail,) by taking more than few grains from each. But from those small quantstities alone, we have no hesitation in asserting that there is no practicle of *carbonate of lime* in either of the three specimens received, which were taken from the upper, middle and lower parts of the stratum. We had before subjected to a more full trial two specimens of the Jersey "marl" described by our correspondent from Long Island, in No. 5, page 272, and found a similar result. As had been supposed before seeing any specimen, and on the grounds stated fully, page 209, No. 4, this earth seems to be the same with what was three called *gypseous earth*, and which is so abundant on James river. From the experience of northern farmers, there can be no doubt of the Jersey earth's being a valuable manure, if jndiciously applied, (though we cannot believe, with Mr. Ames, that it will serve as a substitute for putrescent manures:) but its value is certainly not caused by its containing carbonate of lime, (which only constitutes the worth of marl,) and never has the term *marl* been more misapplied than in this case. But to whatever ingredient this Jersey earth owes its fertilizing effects, there is good reason to hope that the same may be found to some extent in the gypseous earth of Virginia. We have attempted to draw attention to this subject, and have succeded in removing something of the prevailing false opinions; and it is hoped that the labors of a more energetic and competent examiner will show what constitues the value of these earths, as clearly as we have proved that it is *not* that which gives value to marl, or to our beds of fossil shells.—*Ed. F. R.*]

THE BLACK TONGUE.

From the Northampton Courier.

The *black tongue* disease in horses is becoming so prevalent, and spreading with such rapidity, that we are almost induced to believe it a species of cholera. It is infecting horses, cows, oxen, sheep, and even the feathered tribe; and what is most strange, a man near Deerfield, who has been among horses suffering with it, has contracted the disorder! It is a species of putrid sore throat or canker rash, eating off the roots of the tongue, and turning it black, at the same time diseasing the glands of the throat. Cleanliness of racks and mangers should be preserved, and as a preventive, salt is said to be excellent. A piece of gum assafoetida placed in each manger, and another fastened to the water bucket, are indispensible to the health of animals about these times. Another preventive used in large stables in this town, is putting a composition of tar and camphor on a piece of cloth, and winding it round the bits—fine salt thrown into the mouth, and sulphur scattered in the manger occasionally.

DIARY OF THE WEATHER AT FORT MONROE, FOR THE QUARTER ENDING THE THIRTY-FIRST DAY OF DECEMBER, 1833.

Month.	Thermometer.			Winds.	Weather.	Month.	Thermometer.			Winds.	Weather.	Month.	Thermometer,			Winds.	Weather.
Oct.	VII. A. M.	II. P. M.	IX. P. M.			Nov.	VII. A. M.	II. P. M.	IX. P. M.			Dec.	VII. A. M.	II. P. M.	IX. P. M.		
1st	73	76	75	N. E.	Rain.	1st	46	54	52	S. W.	Clear.	1st	47	48	45	N. W.	Cloudy.
2d	74	76	72	N.	Cloudy.	2d	48	59	58	N. W.	"	2d	43	50	52	"	"
3d	69	74	70	N. E.	Clear.	3d	57	59	55	"	Cloudy.	3d	46	51	47	"	"
4th	67	69	66	N.	"	4th	53	56	54	"	Rain.	4th	43	52	50	W.	"
5th	66	68	66	"	"	5th	43	49	45	N.	Clear.	5th	46	47	45	N. W.	"
6th	66	73	69	"	Cloudy.	6th	44	54	55	N. E.	"	6th	42	46	44	N.	"
7th	68	72	70	"	Rain.	7th	52	57	54	W.	"	7th	45	47	46	N. E.	"
8th	70	74	68	S. E.	Clear.	8th	53	65	63	S. W.	"	8th	52	46	45	S. W.	Rain.
9th	68	70	68	N. E.	"	9th	59	63	62	N. E.	Rain.	9th	42	52	48	"	Clear.
10th	68	72	68	"	"	10th	60	60	60	S.	Cloudy.	10th	40	48	43	N.	"
11th	63	65	63	"	"	11th	64	66	64	S. W.	Clear.	11th	40	46	38	N. E.	"
12th	74	67	65	E.	Rain.	12th	62	68	64	"	"	12th	32	40	37	E.	"
13th	61	63	63	S. W.	Clear.	13th	50	56	52	W.	"	13th	38	45	42	N. E.	"
14th	63	65	63	"	"	14th	48	50	48	N. E.	Cloudy.	14th	45	54	49	"	Rain.
15th	63	70	66	"	"	15th	46	48	45	"	"	15th	37	40	38	"	Cloudy.
16th	66	72	70	"	Cloudy.	16th	35	42	34	N.	Clear.	16th	39	51	49	"	Rain.
17th	69	72	72	"	"	17th	30	43	46	N. W.	"	17th	42	43	42	E.	Cloudy.
18th	68	64	62	N.	Clear.	18th	38	48	46	"	"	18th	39	42	41	W.	"
19th	62	69	60	"	Cloudy.	19th	36	45	37	W.	"	19th	39	42	39	S. W.	"
20th	62	64	63	N. E.	Rain.	20th	34	43	41	S. E.	"	20th	33	40	37	W.	"
21st	62	67	65	"	"	21st	46	56	52	S.	"	21st	36	42	40	S. E.	"
22d	63	65	62	N.	"	22d	48	51	46	S. W.	"	22d	40	44	41	W.	"
23d	57	64	62	N. E.	Clear.	23d	43	51	49	W.	"	23d	40	52	47	N. W.	Clear.
24th	61	67	64	S. E.	"	24th	49	54	50	N. W.	"	24th	43	50	43	S. W.	"
25th	63	66	64	S. W.	"	25th	57	59	48	W.	Rain.	25th	43	49	42	..	"
26th	60	65	64	"	"	26th	38	44	42	N.	Clear.	26th	36	42	39	W.	"
27th	52	59	59	"	"	27th	38	53	49	S.	"	27th	37	43	41	S. W.	"
28th	53	56	51	"	"	28th	42	51	47	"	"	28th	36	42	39	"	"
29th	41	48	42	W.	Cloudy.	29th	42	52	48	E.	Cloudy.	29th	36	48	40	"	"
30th	37	42	40	N. W.	Clear.	30th	48	50	48	W.	"	30th	38	46	44	S.	Rain.
31st	35	44	44	N. E.	"	31st						31st	43	45	42	S. W.	Cloudy.
	1924	2038	1956	Total No. of Degrees.			1409	1606	1514	Total number of Degrees			1215	1433	1335	Total number of Degrees.	

ABSTRACT FOR THE QUARTER.

MONTHS.	THERMOMETER. Highest Degree. VII.	Highest Degree. II.	Highest Degree. IX.	Lowest Degree. VII.	Lowest Degree. II.	Lowest Degree. IX.	Mean Temperature. VII.	Mean Temperature. II.	Mean Temperature. IX.	Hottest Day.	WINDS. N. Days.	N. W. Days.	N. E. Days.	E. Days.	S. E. Days.	S. Days.	S. W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cloudy. Days.	Rain. Days.	Snow. Days.	Prevailing.	Coldest Day.
October,	74	76	75	85	42	40	62	65	63	1st.	8	1	9	1	2		9	1		19	6	6		Fair.	30th.
November,	64	68	64	30	42	34	46	53	50	12th.	3	3	7	1	1	4	5	6		21	6	3		"	16th.
December,	52	54	52	32	40	37	39	43	44	14th.	2	5	6	2	1	1	9	5		12	15	4		Cloudy.	12th.

Diary of the Weather at Fort Monroe, Old Point Comfort. for January, 1834.

Month	Thermometer. VII. A. M.	II. P. M.	IX. P. M.	Winds	Weather	REMARKS.
1st	40	48	45	N. E	Cloudy.	
2d	45	55	52	S. W.	Rain.	
3d	36	28	27	N.	Clear.	
4th	24	24	24	"	Cloudy.	Snow, 9 P. M.
5th	23	26	24	N. E.	Snow.	
6th	26	25	22	"	"	
7th	17	29	27	S. W	Clear.	
8th	28	35	34	"	Cloudy.	
9th	29	37	35	E.	Clear.	
10th	34	38	36	N. E.	Rain.	
11th	36	42	37	"	"	
12th	52	62	58	S. W.	Clear.	Rain, 8 P. M.
13th	41	38	36	N. W.	Cloudy	
14th	34	37	34	N. E.	Clear.	
15th	34	36	34	"	"	
16th	34	45	43	"	"	
17th	48	56	54	S.	Cloudy.	
18th	52	58	58	"	"	Rain, 9 P. M.
19th	52	58	58	S. E.	"	
20th	53	50	46	N. E.	"	Dense fog.
21st	30	27	24	N.	Snow.	
22d	18	31	27	N. W.	Clear.	
23d	20	28	23	"	"	
24th	20	35	28	"	"	
25th	22	28	28	"	Cloudy.	S.W. at 8 P.M
26th	31	39	31	"	Clear.	
27th	23	33	31	"	"	
28th	27	32	35	"	"	
29th	32	37	33	N. E.	"	
30th	35	37	38	"	Rain.	
31st	34	42	37	"	Cloudy.	

CARTER'S CATAWBA WINE

[Mr. John Carter, who owns a nursery and vineyard near Richmond, lately presented us with a few bottles of wine of his making, of a beautiful light Madeira color, with a request that his quality should be strictly tested. Not being in the habit of tasting wine, and having no pretensions to *connoiseurship*, we requested a gentleman who is an excellent judge of good wines, to try, and report the quality of this, without being influenced by "favor or affection," an account of its origin. This opinion is expressed in the following letter.]

Richmond, January 22, 1834

To the Editor of the Farmers' Register.

The wine which you presented me with a few weeks ago, was made by Mr. John Carter in 1832, from the Catawba grape, and without any admixture of ardent spirits, or any thing else added to it, but a portion of sugar to the fresh juice of the grape. It is his first experiment; and I really think he deserves encouragement. Indeed I found the quality far better than I expected, and so much better than any home made wine that I have heretofore met with, and so much more like Madeira wine, both in appearance and flavor, that I take pleasure in recommending a trial of it, in justice to Mr. Carter, and hope you will publish this note in your "Farmers' Register."

With great respect, W. R. JOHNSON.

For the Farmers' Register.

COMMERCIAL REPORT.

He who communicates bad tidings performs an unpleasant and thankless task. When prosperity attended all occupations, when every one appeared to be actively and profitably employed, whether in agriculture, manufactures, or commerce, each reaping a fair harvest for his toil, he who undertook to depict the lively scene which was presented to him, felt a pleasing excitement, and a sensation of pride in describing the prosperity of his fellow countrymen. But now that the bright prospect is overcast, a corresponding sympathy excites feelings of a very different character.

So sudden a reverse has seldom, if ever, been experienced, extending as it does, to every class in every community throughout the union. We hear of failures among the merchants of the large cities, and of distress in every quarter. We hear of capitalists who had engaged to furnish large sums of money for the prosecution of works of internal improvement, unable to compiy with their engagements; of large operations undertaken by the states being consequently suspended; of contractors unpaid, and of laborers deprived of employment. We find commerce in a great measure suspended, agricultural productions fallen in price, confidence destroyed, and, in short, an entire revolution from a high state of prosperity to one of despondency and (to many) of ruin.

Where this is to terminate none can yet foresee. The cause is much easier traced than the termination; but it behooves those whose duty it is to guard and to promote the welfare entrusted to them, to put an end to the present state of suspense. Whether the causes of the existing derangement are attributable to personal feeling or to constitutional scruples, the effect is such as requires great forbearance to rest quietly under it.

Before the expiration of another month, it is to be hoped that the Bank and Deposite question, which has engrossed the attention of both houses of Congress will have been brought to a satisfactory close.

Within the last two months every article of export has declined in price. Wheat may be quoted at 85 to 100 cents; Cotton 10 to 10¾ cents; Flour $4 50; Tobacco $3 to $9 50. Public stocks have fallen 10 to 20 per cent. Interest on money which last year was 4½ to 5 per ct. is now 15 to 20 per ct. Stocks in substantial banks at New Orleans which were worth $116 have fallen to $94. Exchange on England 4 per cent. *below par*—a circumstance unprecedented since the resumption of specie payments in England X.

January 28, 1834.

ROT IN COTTON.

From the Louisiana Register.

Parish of East Baton Rouge, Jan. 1834.

MR. ALEXANDER: I observe in No. 31 of your Register, that a writer in the "Southern Agriculturist" has offered a solution to the often agitated inquiry, "what is the cause of the rot in cotton?" I beg leave to differ from that writer in opinion. I believe it is caused by an insect perforating the boll. Some few years since my attention was drawn to this subject, and I became satisfied that the rot was caused by an *ant*;—in coming to this conclusion, I observed the bolls of the Tennessee, Alvarado, and the Creole black-seed cotton, growing in the same field. Each was equally perforated; but the hull of the Tennessee, which was three-fourths thicker than the Creole, could not be penetrated by the ant. By taking the bolls of each kind of cotton, and with a knife paring off the hull, or covering of the boll, the depth that the bill of the ant had penetrated, might be easily traced. The hull of the Tennessee cotton, of the first year's growth, would not be perforated more than half way through; the Alvarado was not as thick, but sufficiently so to prevent injury; while the thinness of the Creole admitted the bill of the ant to the seed.

It is in wet seasons, when the growth of cotton is luxuriant, and fermentation easily excited, that we witness the greatest devastation. It is probable the ant may be found in all cotton growing countries, and equally abundant every year: but from some local cause, either from the peculiarity of the season, or quality and exposure of the soil upon which the plant is situated, the hull is more or less thick. It must be owing principally to the place or climate, as it is observed, Tennessee or Alvarado after being planted here a few years, are equally liable to the rot. On observing the thickness of the covering of the bolls of the Tennessee cotton of the first, second, and third year's growth, I found that in the latter year the hull was as thin as that of the Creole.

NUMBER AND INCREASE OF CORRESPONDENTS.

The friends and correspondents of the Farmers' Register may feel some interest in the following exhibit of the number of individuals who have added to the value of our work by their communications. It is cause for congratulation, and an augury of valuable future results to the agricultural interest of our country, that so many intelligent farmers should already have surmounted their objections to writing, and are willing to unite in this great plan of "mutual instruction." This number might be, and we hope yet will be, increased tenfold.

It should be observed, that no one individual is counted twice in the following enumeration, although he may have written many times, and that no private correspondent, (as such) is counted at all. This distinction is made because all extracts from private correspondence are inserted without authority from the writers—and because it is hoped and expected, that all private correspondents (who are not already included,) will hereafter be enumerated among the writers of articles intended for publication.

In No. 1, there were original communications from 7 correspondents

No. 2,	6	other new correspondents
No, 3,	8	— — —
No. 4,	12	— — —
No. 5,	14	— — —
No. 6,	6	— — —
No. 7,	12	— — —
No. 8,	15	— — —
No. 9,	20	— — —

Whole No. of correspondents 100.

TO CORRESPONDENTS AND READERS.

In this and the preceding No. of the Farmers' Register, we have been enabled to present to our readers an

unusually large proportion of original matter—thus exhibiting an illustration of the value that may be given to such a journal by those who are most interested in its success. There is good reason to expect a continuance and increase of our correspondence. But as such supplies must be necessarily irregular, and as the publication of no communication is delayed, merely to equalize the rate of supply, it may be expected that some future numbers may appear very deficient in original communications—and such an occurrence should not be taken as an indication of a cessation of the labors of our correspondents, or of a diminishing value in the publication. Our selected articles are always more in number than we can find space for, and these of course must wait as long as there are original communications to claim precedence in publication.

DISCONTINUANCE OF AGENCIES.

We have made but very limited use of agencies, (as stated particularly in a former No.) and find it necessary to discontinue all, without exception. This step is not caused by the slightest objection to the acts of any of the few gentlemen whom we have authorized as agents: but because agencies are supposed to exist where none have been authorized, and payments are made accordingly, instead of directly by mail to the proprietor. After this notice, there will be no agent for the Farmers' Register. This annunciation does not affect the continuance of a extra copy being furnished to any person who will obtain four new subscribers, and send their payments in advance—except, that to prevent the trouble and embarrassment of opening accounts for such purposes, no claim for the fifth copy will hereafter be allowed, except for four names of new subscribers, and $20, *all sent at one time*. Then the compensation will be immediately allowed, and the transaction closed.

TO POSTMASTERS.

Notwithstanding the great care used in wrapping the copies of the Farmers' Register, and directing each separate copy to the individual subscriber, as well as the whole package to the proper post office, complaints continue to be made of subscribers failing to receive their copies, and sometimes whole packages miscarry by mail, and are never heard of afterwards. With every care that can be used in a publication office, mistakes in directing packages must sometimes be made: and in a very few cases only, such errors have been made known by postmasters, and corrected. For such corrections we will always be thankful, and also for immediate information of any minor faults in the mailing and securing of packages. But much the greater number of failures, which have caused so much loss to our establishment, cannot possibly be owing to any of these causes, nor even to the accidental erasure of names on the packages, in the mails, nor to the total destruction of the wrappers. Even when such rare mishaps occur, (if they ever occur,) the names of subscribers remain—and if their place of residence is not known, the place of publication cannot be doubtful—and we will be glad to pay the postage on all miscarried copies (except of No. 1, of which many were distributed as specimens,) by having them sent by mail either to the publisher, or the editor.

Though under no such obligation, we have supplied duplicate copies in most cases of alleged failures by mail. But there must be some limit or regulation to these supplies—and we propose the following: Every postmaster at whose office copies of the Farmers' Register are received for subscribers, is requested to keep a list of their names, and to compare with that list the contents of every package, before delivering any part of it. This being done, whenever any subscriber's copy is missing, or the whole package has been lost, and the postmaster (after waiting long enough for the package to return from its wrong route,) will certify the particular loss, we will henceforth furnish, in all such cases, one duplicate copy for every one so lost. If this plan should be generally approved, it is intended to make this guarantee general (upon certain conditions) for Vol. 2. It will therefore be to the interest of subscribers to induce the adoption of the foregoing regulation at their respective post offices. If any postmaster will not agree to undertake so light a service for the benefit of his customers, it will be for us a sufficient acquittance from this obligation thus voluntarily offered to be assumed.

COMMUNICATIONS RECEIVED

The following communication have been received, and will be published in No. 10, of the Farmers' Register:

"*Translation from Arabic work on Agriculture,*" *(continued)*—"*Blue Grass*"—"*Importance of a proper mode of harnessing horses*"—"*Plain directions for analyzing marl, &c.*"—"*On surface draining, &c.*"—"*Remarks on the slack coals (or terre-houille) of the Chesterfield mines*"—"*On the preparation necessary for a crop of tobacco*"—"*Specimens of calcareous manures*"—"*On Wire grass,*—"*A Farmers' Directory suggested*"—"*Culture of Cotton*"—"*Chemical Analyses of Sheils.*"

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